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Office of Technology Assessment

LIFE-SUSTAINING TECHNOLOGIES AND THE ELDERLY WORKING PAPERS, VOLUME 3: LEGAL AND ETHICAL ISSUES, MANPOWER AND TRAINING, AND CLASSIFICATION SYSTEMS FOR DECISIONMAKING

July, 1987

An Ethical Analysis of Withdrawal From Life-Sustaining Technologies and Assisted Death, by James F. Childress, Department of Religious Ethics, University of Virginia, Charlottesville, VA.

Distributive Justice and the Allocation of Technological Resources to the Elderly, by Robert M. Veatch, Kennedy Institute of Ethics, Georgetown University, Washington, DC.

Life-Sustaining Technologies and the Elderly: The Legal Issues, by Connie Zuckerman, Montefiore Medical Center, Bronx, NY.

Geriatric Expertise in the Context of Critical and Terminal Care, by Patricia Barry and Lawrence Markson for the American Geriatrics Society, New York, NY.

Manpower for Selected Technologies, by Ruth S. Hanft, Catherine C. White, and Linda E. Fishman, Ruth Hanft Associates, Washington, DC.

Classification Systems for Decisionmaking for Critically Ill Elderly Patients, by Robert W. Gage, Stanley Lemeshow, and Jill S. Avrunin, University of Massachusetts, Amherst, MA; and Daniel Teres, Baystate Medical Center, Springfield, MA.

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J952-54

An Ethical Analysis of Withdrawal From Life-Sustaining Technologies and Assisted Death

A Report for the Office of Technology Assessment

Second Draft
October 4, 1985

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Introduction

This report is designed to offer an ethical analysis of decisions to withhold and to withdraw life-sustaining technologies from patients in accord with their wishes and interests. Few debates in our society have been as complicated or as confused as debates about life-sustaining technologies over the last ten to fifteen years. Thus, it was not surprising that the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research undertook an examination of decisions to forgo life-sustaining treatment--which was not part of its original legislative mandate-- as a "natural outgrowth" of its studies on informed consent, the definition of death, and access to health care, and as a way to deal with "some of the most important and troubling ethical and legal questions in modern medicine." However, as the chairman, Morris Abram, noted when he submitted the resulting report, Deciding to Forego Life-Sustaining Treatment, the Commission concluded "that the cases that involve true ethical difficulties are many fewer than commonly believed and that the perception of difficulties occurs primarily because of misunderstandings about the dictates of law and ethics" (President's Commission, 1983).

Whether real or only apparent, ethical difficulties, dilemmas, quandaries, or problems are generated by perceived conflicts among ethical principles and values. Thus, it is essential to examine those principles and values, especially as they are reflected in religious and humanistic traditions, legislative actions, judicial decisions, and codes and practices of professional conduct. Without denying different emphases and positions, it is possible to identify several ethical principles and values that are commonly invoked to set and resolve such ethical difficulties. Several of these principles-- especially beneficence, nonmaleficence, utility, autonomy, and justice-- are identified and explicated in Task # 1; they do not presuppose any particular ethical theory but are compatible with and can be derived from several different religious and humanistic ethical theories. In short, they represent ethical considerations that are widely accepted, even though their proponents frequently differ about their grounds and about their implications for particular cases.

How these ethical principles and values are applied to particular cases often depends on intermediate principles, rules, and distinctions, such as the distinctions between killing and letting die, between direct and indirect effects of actions, and between ordinary and extraordinary means of treatment, all discussed under Task # 1. One major task of ethical analysis is to examine and assess these distinctions in light of the general principles and values and the realities of particular life-sustaining technologies, such as renal dialysis, antibiotics, artificial nutrition and hydration, resuscitation, and mechanical ventilation, in treatment of the elderly. Such an analysis will involve careful scrutiny of representative positions, including the arguments for and against those positions.

Ethical analysis also involves conceptual analysis, since some of the key concepts are often in dispute. For example, several traditions hold that suicide is wrong, but accept some acts that result in one's own death while denying that they are acts of suicide. Other traditions may hold that those acts are justifiable acts of suicide. Thus, it is not enough to know whether a tradition accepts or rejects suicide, but also how it distinguishes suicide from other acts such as refusal of life-sustaining technologies under some conditions. Similarly there are debates about the concept of "assisted death" as well as about the moral acceptability of acts that fall under this concept.

Ethical analysis is often interwoven with other kinds of analysis, such as scientific, political, legal, and economic analysis. Hence, an ethical analysis of policy options regarding life-sustaining technologies will inevitably incorporate scientific data and presuppose political constraints, such as the system within which the legislation occurs. However, it is possible to concentrate on and to highlight ethical considerations, as this report does, without totally separating ethics and other matters.

Task # 1. Analysis of the Distinctions among Types of Withholding and Withdrawing Life-Sustaining Technologies

A. Definition and Description of Types of Withholding and Withdrawing of Life-Sustaining Technologies

Life-sustaining treatment "encompasses all health care interventions that have the effect of increasing the life span of the patient" (President's Commission, 1983), and life-sustaining technologies include all health care technologies that can probably sustain a pereson's life for some period in the presence of life-threatening conditions. Several distinctions have been developed for the moral assessment of the use of life-sustaining technologies. However, there is widespread recognition that these distinctions rarely provide conclusive moral answers; their primary function is to suggest relevant moral principles and values. The following principles or values have been widely endorsed and applied in somewhat different but largely consistent formulations: (1) Benefitting patients (the principle of beneficence); (2) Not harming--including not killing-- patients (the principle of nonmaleficence, which is sometimes viewed as a subset of the principle of beneficence; see National Commission, 1978); (3) Maximizing welfare for all parties, families and society as well as patients (sometimes called the principle of utility or proportionality); (4) Respect for patients as persons, including their autonomy (sometimes called the principle of respect for persons or the principle of autonomy); (5) Treating patients and others justly (the principle of justice or equity in the distribution of benefits and burdens). (For variations of these principles see National Commission, 1978; Beauchamp and Childress, 1979 and 1983; Veatch, 1981; President's Commission, 1983.) Other independent or derivative principles have been recognized, including privacy, truthfulness, and fidelity in keeping promises and contracts

(Veatch, 1981; Beauchamp and Childress, 1983).

In part, the distinctions that have been developed regarding the use of life-sustaining technologies indicate when the second principle (nonmaleficence) is not violated by actions that result in death (whether those actions were performed by the one whose death occurred or by others) or when its infringement is justified because of other competing principles. Because of the strong prohibitions that are derived from the second principle, which in the Hippocratic tradition of medicine is interpreted as "first of all or at least do no harm," both suicide and mercy killing are prohibited. Death is viewed as a major--often the major--harm, and thus deliberately engaging in actions that bring about, hasten, or cause death is prima facie wrong as a violation of the principle of nonmaleficence. This principle is so stringent that most traditions tend to _justify_ killing persons only in self-defense, war, and capital punishment (the last is more controversial) and tend to view acts that cause the deaths of innocent persons, even those who are suffering greatly, as justifiable only if they fall outside the rule that prohibits the direct killing of innocent persons. Thus, much of the debate, as we will see, hinges on whether and which acts can be described and evaluated as not being instances of suicide or mercy killing (euthanasia). The following distinctions are designed precisely to rebut the charge that actions that result in death really violate the principle of nonmaleficence. They appeal to other principles usually not to override the principle of nonmaleficence but to show that actions that appear to violate the principle actually fall outside it and are justified by other principles, such as the decedent's prior request (the fourth principle) or intense suffering (the first principle).

1. The distinction between _withholding_ (not starting) and _withdrawing_ (stopping) life-sustaining technologies. This first distinction, which also figures at least implicitly in some other distinctions, is often _felt_ by physicians and others to be very important, even though it is hard to defend in terms of various ethical traditions, whether religious, humanistic, or medical. Case # 1 indicates how this distinction has an intuitive appeal to some professionals

and others. An attending physician asked me to serve as an ethics consultant for the staff caring for an elderly man, who was suffering from several major medical problems, including terminal cancer, with no reasonable chance of recovery. The patient was clearly incompetent and could not communicate with others; he had no family to serve as proxy decision-makers. The members of the staff caring for the patient had easily and quickly agreed on a "no code" or "do not resuscitate" (DNR) order. They felt comfortable with this decision because of the patient's overall condition and prognosis and because not resuscitating the patient in the event of cardiac arrest could be viewed as withholding (not starting) rather than withdrawing (stopping) treatment. The patient was being maintained by intravenous nutrition and hydration and antibiotics to fight infection. Several members of the team thought that all medical treatments, including artificial nutrition and hydration and antibiotics, should be stopped, but others, perhaps a majority, thought that it would not be right to stop these treatments. However, when an IV line infiltrated, some of the latter group concurred that it was not obligatory to start the line again, especially if it involved a cut-down, because it could be viewed as starting rather than continuing a treatment. However, others sharply criticized this use of the distinction between withholding and withdrawing treatments, on the grounds that it was self-deceptive rationalization or unnecessary sophistry.

The conceptual and normative roots of the distinction between withholding and withdrawing treatments are tangled. Perhaps the most plausible argument is that in beginning a life-sustaining treatment a professional makes a promise, creates an implied contract or covenant, or engenders expectations, which, on grounds of fidelity or loyalty to the patient, require that the treatment not be stopped. However, others contend that the fundemental promise is to act in accord with the patient's wishes and interests (the principles of beneficence and respect for persons), which can nullify or override the promise to the patient. Furthermore, many argue, this distinction between withholding and withdrawing treatments is often morally pernicious. Obviously it may lead to overtreatment, but it may also lead to undertreatment, since some professionals have reportedly been reluctant to start treatments in some circumstances for fear of being locked in to their continuation. However, it is often necessary to start life-sustaining treatments in order to gain time and information for a better diagnosis, prognosis, and decision. Thus, it is plausible to argue, as the President's Commission (1983) does, that the burden of proof should be higher for withholding than for withdrawing treatment since a judgment about the latter could presumably be reached on more solid grounds. And the same moral principles are relevant to and conclusive for decisions to withhold or to withdraw life-sustaining treatments: "whatever considerations justify not starting should justify stopping as well. Thus the Commission concludes that neither law nor public policy should mark a difference in moral seriousness between stopping and not starting treatment" (President's Commission, 1983, p. 77).

2. The application of the distinction between direct (intended) and indirect (unintended but foreseen) effects of actions is also controversial. There is general agreement about the prohibition of directly killing patients, for example, through poisoning or shooting them, and there is general acceptance of actions that relieve pain and suffering even though they may hasten death, if they are in accord with a patient's wishes and interests. This distinction has often been used in the Roman Catholic tradition, but in other traditions and contexts as well, to show that some actions that have a harmful effect, such as death, do not always fall under such moral prohibitions as suicide or murder because the harmful effect is indirect, unintended, or merely foreseen and, as such, is justified by other features of the act and its consequences. Traditionally this distinction between direct and indirect effects has involved four conditions: (1) The action in itself must be good or at least morally indifferent; (2) the agent must intend only the good effect and not the evil effect; (3) the evil effect cannot be a means to the good effect; the good and evil effects must follow immediately from the same action (otherwise the

evil would be intended as a means to the good end); (4) There must be proportionality between the good and evil effects of the action, that is, a proportionately grave or serious reason for allowing the evil effect to occur. The evil effect is allowed, not sought; it is foreseen, not intended. (For a summary of the rule of double effect, see Mangan, 1949; Boyle, 1980; Beauchamp and Childress, 1983).

Most often the rule of double effect is invoked when there is a conflict between obligations or values and it is not possible to meet or to realize all of them at that time in the situation. For example, in the care of terminally ill patients, the principle of nonmaleficence establishes a duty not to harm or kill the patients, but the principles of beneficence and respect for persons establish a duty to make the patient comfortable by relieving pain and inducing sleep if the patient desires. However, in some situations it may be possible to discharge the latter duty only be engaging in actions that hasten the patient's death. When the four conditions of the rule of double effect are met, it may be justifiable to engage in actions that can be reasonably predicted to hasten the patient's death; such actions do not count as violations of the principle of nonmaleficence or as homicide. According to the Ethical and Religious Directives for Catholic Health Facilities, "it is not euthanasia to give a dying person sedatives and analgesics for the alleviation of pain, when such a measure is judged necessary, even though they may deprive the patient of the use of reason, or shorten his life" (see also Sacred Congregation, 1980, for a similar statement).

The rule of double effect thus distinguishes between relieving pain at the risk of bringing about death and relieving pain by bringing about death. The distinction between direct and indirect effects cannot do all the moral work that has to be done: (1) Not all actions that foreseeably result in death are justifiable, and (2) some actions that intentionally result in death may be justifiable-- e.g., removing a respirator under some circumstances. The Judicial Council of the American Medical Association (1982) holds that that the physician "should not intentionally cause death" just after conceding that it is ethical to "cease or omit treatment to let a terminally ill patient die." However, omissions may involve the intentional causation of death, even if they do not always result in death (i.e., the patient may survive despite the intentional omission). According to some critics of the distinction, the question is not whether death is intended as an end or as a means, but how death is brought about, and that the society has moral reasons for excluding some means of bringing about death, even if there is agreement among all the parties, including the patient, that he or she would be better off dead. Some means of bringing about death, such as poisoning or shooting the patient, may be ruled out, on grounds other than the rule of double effect. Hence, the critical question does not concern primary and secondary intentions or even primary and secondary-- or direct and indirect-- effects, but the means of death, particularly the distinction between killing and letting die.

3. Letting die and killing. In one situation (Case # 2) Mr. R, 62 years old, was hospitalized for metastatic cancer of the colon. When it became clear that he would not likely benefit from either chemotherapy or radiation, Mr. R refused further laboratory tests, antibiotics, transfusions, and dialysis, while accepting pain medication, nasogastric suction, and intravenous fluids. Four days later he asked doctors to "speed up" his death, less because of his pain and discomfort and more because he could not endure the dying process any longer and did not want to jeopardize his family's limited financial resources. "In this case," Lo and Jonsen (1980) write, "the house staff gave substantial doses of morphine and diazepam, with the agreement of the patient and family." This case cannot be brought under the rule of double effect for "allowed deaths" ; the medication was not given to relieve pain at the risk of hastening death. It was not a case of letting the patient die but rather one of directly and actively killing the patient at his request.

Sometimes the distinction between killing and letting die is discussed under other headings, such as omission and action or passive and active, because it is argued that more descriptive terms are need to replace "killing", which most tend to view as wrong, and "letting die", which most tend to view as right. Thus, the President's Commission (1983) used the descriptive terms: actions that lead to death and omissions that lead to death. Whatever terms are employed, the issues are the same. Most ethical traditions prohibit the direct, active killing of patients as a rule, even though they disagree about the foundations of that rule. Some hold that it is intrinsically wrong to kill innocent persons; others hold that it is not intrinsically and absolutely wrong to do so, for example, when the suffering patient requests "mercy killing," but that a rule prohibiting mercy killing is necessary in order to prevent bad consequences for future patients and ultimately for the society. Thus, many who deny that acts of killing innocent persons are always wrong still support a rule of practice that prohibits such acts in part because of the dangers of abuse, loss of trust between professionals and patients, and subversion of the societal commitment to the protection of human life-- a version of the wedge or slippery slope argument (for several reasons, see Veatch, 1976). Some of the main arguments against appeals to the distinction between killing and letting die focus on claims about the intrinsic wrongness of killing versus letting die; others focus on the application of the distinction (for several arguments, see Steinbock, 1980).

Some critics hold that there is no intrinsic moral difference between killing and letting die; whether there is a moral difference will depend on the circumstances of the case. Thus, in a widely discussed article, James Rachels (1975) contends that the "bare difference" between acts of killing and acts (omissions) of letting die is not in itself a morally relevant difference; he argues for his point by sketching two cases that differ only in that one involves killing, while the other involves allowing to die, and asks whether we would make different moral judgments about the cases. In those cases-- killing a six-year-old cousin or letting him die in order to gain a large inheritance-- both acts are equally reprehensible because of the agent's motives, ends, and actions or nonactions. But those reprehensible cases may obscure the significance of the distinction in other cases where agents are trying to benefit (rather than harm) patients and where they are also concerned about the broader social consequences of rules that permit or prohibit such actions or omissions. Even though the distinction may not be important in some contexts, it may be important in others because of other moral principles and rules. It may be the best compromise among competing moral considerations: respecting a patient's wishes, relieving the patient's pain and suffering, and protecting the society's commitment not to let innocent people be killed.

The prohibition of direct, active killing of innocent persons is built into the legal system as well as into professional codes and religious and humanistic traditions. Arguments to change this rule often appeal to cases of extreme, intractable pain and suffering, usually from a slow death from cancer. According to critics of the rule, a failure to kill the patient in those circumstances, when the patient pleads for "mercy", is cruel and inhumane. Several responses have been offered.

First, it is not clear that there are many cases of uncontrollable pain and suffering; in the medical setting (perhaps in contrast to the battlefield or an accident) pain can usually be controlled, even if relief hastens death (which is acceptable according to the rule of double effect). (For an examination of these matters, see President's Commission, 1983, pp. 73, 19-20, 275-97.)

Second, the caring professions should take more seriously the obligation to relieve pain and suffering and provide medications that will be effective, worrying less about addiction and side-effects in terminal cases (Angell, 1982).

Third, permitting mercy killing will divert attention from finding methods short of killing and institutional and social contexts such as hospice that can reduce the pain and suffering to tolerable levels.

Fourth, in view of the uncertain need to change the rule in order to express beneficence (relieve pain and suffering) and in view of the dangers to the society through abuse, decline of trust within medical relationships, and the threat to the principle of nonmaleficence that prohibits killing, there do not appear to be sufficient reasons to change the rule. Some argue that the burden of proof should be on those who would maintain a rule that infringes the principle of autonomy. However, it is plausible to argue that the policy and practice of prohibiting killing while accepting some cases of allowed deaths has served the society well, though not perfectly, and that the burden of proof should rest on those who argue for changing it; furthermore, many contend, that burden has not been met. Before the society undertakes a major alteration of this rule, it needs strong evidence that the changes are really needed to avoid harms and secure benefits for patients and that the good effects will outweigh the bad effects for all parties, including the society (Beauchamp and Childress, 1983).

Fifth, there are ways to "accept" some exceptional cases of "mercy killing" without changing the current legal and social prohibition-- e.g., prosecutorial discretion, jury findings of not guilty by reason of temporary insanity, and recognition of "mercy" as a factor that mitigates punishment even though it may not exculpate the agent. Even with these informal exceptions, the rule may serve as a valuable reminder of the importance of the principle of nonmaleficence ("first of all or at least do no harm") may provide a valuable cautionary note. Some argue that a regulatory scheme with procedures to make sure that the patient really wants to die would also prevent abuses; however, the formalization of the process would have its own costs because it would involve the society prospectively and directly in deciding and implementing mercy killing.

Even if the distinction between killing and letting die is accepted as a social and legal rule for extrinsic rather than intrinsic reasons, there are still debates about where the line is and should be drawn between killing and letting die. It is not sufficient to point to the categories of active and passive or action and omission. Nor is it simply a matter of identifying the cause of death-- letting die involving "natural" causes such as the underlying disease as suggested by the language of "natural death"-- for identifying "the cause" in moral and legal settings is in part a normative as well as an empirical matter. It hinges on prior judgments about what will count as causes (President's Commission, 1983). And people can be as responsible-- morally and legally as well as causally-- for omissions as for comissions. Whether omissions will count as causes of death will depend in part on whether there is a moral or legal responsibility to sustain life, which is the question that the distinction is sometimes supposed to resolve. There will always be some ambiguity and uncertainty about the line between killing and letting die, and some health care professionals and others will draw it in different places, as in the conflicts in Case # 1 above. However, there are some clear cases of direct, active killing, as in Case # 2 above, and it is not unreasonable to maintain their prohibition even as the society continues to assess where the line should be drawn, for example, regarding artificial nutrition and hydration. The President's Commission (1983, p. 72) found "this limitation on individual self-determination to be an acceptable cost of securing the general protection of human life afforded by the prohibition of direct killing."

4. Ordinary and extraordinary means of treatment. Originally formulated in Roman Catholic moral theology, this distinction, which is expressed in several different terms such as "routine" and "heroic," is now widely adopted in other ethical traditions as well as in legal decisions and professional codes and practices; for example, after prohibiting "mercy killing" or the "intentional termination of the life of one human being by another," the American Medical Association House of Delegates in 1973 held that the patient and/or his immediate family can decide about the "cessation of extraordinary means to prolong the life of the body when there is irrefutable evidence that biological death is imminent." Similar distinctions have been invoked

in other professional codes and legal decisions. As developed by Roman Catholics to deal with problems of surgery prior to the discovery of antisepsis and anesthesia, the distinction was used to determine whether a patient's refusal of treatment should be classified as a suicide (for the development of the distinction, see McCartney, 1980). Refusal of "ordinary" means of treatment was viewed as suicide, whereas refusal of "extraordinary" means was not viewed as suicide; withholding or withdrawing "ordinary" means from a patient was homicide, whereas withholding or withdrawing "extraordinary" means was not considered homicide. According to Gerald Kelly (1951), one of the most distinguished and influential interpreters of the distinction, "Ordinary means are all medicines, treatments, and operations, which offer a reasonable hope of benefit for the patient and which can be obtained and used without excessive expense, pain, or other inconvenience. Extraordinary means are all medicines, treatments, and operations, which cannot be obtained or used without excessive expense, pain, or other inconvenience, or which, if used, would not offer a reasonable hope of benefit." As developed by Kelly, the distinction does not refer to properties of medical practice or of the technologies themselves; it rather hinges on two criteria: whether any particular medical treatment offers a reasonable chance of benefit and whether its probable benefits outweigh its probable burdens, including expense and pain.

However, as it is now often used in moral discourse in and about medical care, the language of ordinary and extraordinary means is subject to the criticism that it tends to focus attention on customary medical practice and technologies rather than on the underlying principles and values that the distinction should express in particular cases. Hence technologies are sometimes viewed as "ordinary" if it is "usual" or "customary" for physicians to use them for certain diseases or problems and "extraordinary" or "heroic" if not. The patient as a person often disappears from view. Several other criteria have been invoked to distinguish ordinary from extraordinary means of treatment: their simplicity (simple/complex), their naturalness (natural/artificial), their expense (inexpensive/costly), their invasiveness (noninvasive/invasive), their chance of success (reasonable chance/futile), their balance of benefits and burdens (proportionate/disproportionate). It is alleged that a technology that meets the first of the paired terms is closer to ordinary, while one that meets the second of the paired terms is closer to extraordinary.

Some ethicists (e.g., Ramsey, 1978; Veatch, 1976) propose to replace the terms "ordinary" and "extraordinary" with other terms that are less misleading. "Ordinary" could be reconstructed to mean morally obligatory, mandatory, required, or imperative, while "extraordinary" could be be reconstructed to mean morally optional, elective, or expendable. Such terms probably reflect the point of the distinction more clearly than the current terms. But if the reconstructed meaning is accepted, there is still the question about which of the above criteria or other criteria can adequately distinguish obligatory from optional treatments in particular circumstances. If the above criteria are relevant-- and some may be relevant-- it is only because they express other principles and values, such as acting in accord with a patient's wishes (the principle of autonomy) and in accord with a patient's interests (the principles of beneficence and nonmaleficence). For example, if an available treatment is simple and natural but not in accord with a patient's wishes and interests, it is hard to see why it should be handled differently than another treatment that is complex and artificial. Furthermore, many of the criteria are unclear. According to one study conducted after the natural death act was implemented in California, physicians in that state generally viewed respirators, dialysis, and resuscitators as "artificial," but split evenly on intravenous feeding, while two-thirds viewed insulin, antibiotics, and chemotherapy as "natural" (Redleaf, et al., 1979). Other criteria, such as the degree of invasiveness (noninvasive/invasive) and cost (expensive/costly), may be morally relevant in view of the patient's overall condition, interests, and preferences. The main consideration for many ethical traditions is consistent with what Kelly

(1951) proposed and with what is now often expressed by the criterion of proportionality (Sacred Congregation, 1980): "Is it necessary in all circumstances to have recourse to all possible remedies? In the past, moralists replied that one is never obliged to use 'extraordinary' means. This reply which as a principle still holds good, is perhaps less clear today, by reason of the imprecision of the term and the rapid progress made in the treatment of sickness. Thus some people prefer to speak of 'proportionate' and 'disproportionate' means. In any case, it will be possible to make a correct judgment as to the means by studying the type of treatment to be used, its degree of complexity or risk, its cost and the possibilities of using it, and comparing these elements with the result that can be expected, taking into account the state of the sick person and his or her physical and moral resources."

In general, these several distinctions-- withholding/ withdrawing; direct and indirect effects; killing and letting die; and ordinary and extraordinary means-- do not provide moral answers, although they may reflect important moral considerations. Whether these distinctions are valuable will depend then on whether they direct our attention to and illuminate or distort the relevant moral considerations, particularly the principles and values that have been identified as part of a widespread consensus in a pluralistic society. According to several ethical traditions, the relevant moral considerations are the patient's wishes and interests, in light of his or her condition, and in view of the overall societal allocation of resources and the necessity of some societal rules, such as the prohibition of killing, to prevent bad consequences.

5. Major issues in line-drawing among levels and kinds of treatment. In view of the above distinctions and their underlying principles and values, it is important to turn to levels and kinds of technologies to care for patients, including to sustain their lives. An article by Wanzer, et al. (1984) described several general levels of care: (1) emergency resuscitation; (2) intensive care and advanced life support, including mechanical ventilation; (3) general medical care, including antibiotics, dialysis, and artificial hydration and nutrition; and (4)

general nursing care including pain relief and hydration and nutrition for patient comfort. It is evident that these levels encompass the several types of technology that OTA plans to explore, and it is important to analyze the arguments for and against withholding or withdrawing these levels of care in some siutations such as in the following two cases.

In Case # 3, Mrs. X, a seventy-nine year old widow, had been a resident of a nursing home for several years. In the past she had experienced repeated transient ischemic attacks. Because of progressive organic brain syndrome, she had lost most of her mental abilities and had become disoriented. She also had episodes of thrombophlebitis as well as congestive heart failure. Her daughter and grandchildren visited her frequently and obviously loved her deeply. One day she was found unconscious on the bathroom floor of the nursing home. She was hospitalized, and the diagnosis was a a "massive stroke." She made no recovery, remaining obtunded and nonverbal, but she continued to manifest a withdrawal reaction to painful stimuli and some purposeful behaviors. Mrs. X refused to allow a nasogastric tube to be placed in her stomach; at each attempt she thrashed about violently and pushed the tube away. After the tube was finally placed, Mrs. X pulled out of restraints and managed to remove it. After several days, her IV sites were exhausted. The question for the staff was whether to do further "extraordinary" or "heroic" measures to maintain fluid and nutritional intake for this elderly patient who had made no recovery from a massive stroke and who was largely unaware and unresponsive. After much mental anguish and discussion with the nurses on the floor and with the patient's family, the physicians in charge decided not to provide further IVs, cut-downs, or a feeding tube, and to allow Mrs. X to die. She had minimal oral intake and died quietly the following week. [This case has been adapted from one presented by Dr. Martin P. Albert, Charlottesville, VA]

In Case # 4, Dr. Hilfiker (1983) reports being called at 3:00 AM by the nurse at the nursing home where Mrs T, an eighty-three year old woman, had been confined since her stroke three years earlier. Mrs. T is now bedridden and aphasic, weighs only 69 lbs., and has decubitus ulcers on her back and hip, and the nurse reports that she has a fever, hasn't been eating much the last few days, and has a little cough. Dr. Hilfiker goes to the nursing home where he examines Mrs. T who peers at him from behind her blank face. His tentative diagnosis is pneumonia, and he asks the nurse to call the technican out of bed for a chest x-ray and also orders a urine culture. Dr. Hilfiker and the nurse note that Mrs. T's only friend in the nursing home who probably knows better than anyone else what Mrs. T. would want has said that she "hoped there wouldn't be any heroics if Mrs. T... got sick again." But the only relative (a distant niece who lives far away) had called to request that "everything possible" be done for her aunt. Dr. Hilfiker reflects, "There in the middle of the night I consider 'doing everything possible' for Mrs. T: transfer to the hospital, intravenous lines for hydration and antibiotics, thorough laboratory and x-ray evaluation, twice-daily rounds to be sure that she is recovering, more toxic antibiotics, and even transfer to our regional hospital for evaluation and care by a specialist. None of it is unreasonable, and another night I might choose just such a course. But tonight my human sympathies lie with Mrs. T and what I perceive as her desire to die... In any event I decide against the heroics. But I can't just do nothing, either. My training and background are too strong. I do not allow myself to be consistent and just go home. Compromising (and ultimately making a decision that makes no medical or ethical sense at all), I write orders instructing the staff to administer liquid penicillin, to encourage fluid intake, and to make an appointment with my office so that I can reexamine Mrs. T in 36 hours."

In case #3 the family and staff decided to let Mrs. X die even though they could have prolonged her life for some time through medical nutrition and hydration. In case #4 Dr. Hilfiker decided to encourage fluid intake and to administer liquid penicillin but not to provide intravenous lines for hydration and antibiotics. He conceded that his "compromise" made no "medical or ethical sense at all." Nevertheless, it clearly represents one way to draw lines in withholding and withdrawing treatments.

As both cases suggest, one major issue in drawing lines is whether all medical treatments, depending on the circumstances, can be construed as "heroic" or "extraordinary" rather than "ordinary" or as "optional" rather than "obligatory" because out of proportion with the patient's wishes and interests. This question has been examined in several major court decisions and widely discussed in the literature in the last two or three years (see Lynn and Childress, 1983; Callahan, 1983; Capron, 1984; Cassell, 1984; et al.) in efforts to determine whether medical nutrition and hydration by peripheral or central intravenous lines, naso-grastric tubes, or gastrostomies are more similar to other medical treatments, such as respirators, or more similar to the provision of food and water by mouth; whether they are needed for comfort and dignity even when they are morally optional for the prolongation of life; and whether they so symbolize care and compassion that to withhold or to withdraw them would threaten the foundation of humane and respectful medical care and ultimately our societal interaction. If nutrition and hydration through medical means is relevantly similar to other medical treatments, then their use can be decided according to the criteria discussed above.

Critics of this position, which I have defended (Lynn and Childress, 1983; Childress, 1985), make several arguments. One argument is that medical nutrition and hydration are significantly different from other medical treatments because they are essential for comfort and dignity even if they are not essential for life-prolongation. However, some means, such as a central IV, involve risks, and some means may require that the patient be physically constrained. In addition, there is evidence that patients who are allowed to die without artificial hydration may die more comfortably than patients who receive such hydration (Zerwekh, 1983). A second argument is that in withdrawing medical nutrition and hydration the agent intends or aims at the patient's death (Meilaender, 1984). However, as discussed earlier, this intention may be present in other cases, such as removing the respirator, and may not be inappropriate in all cases.

Third, what is probably the major criticism stresses the symbolic significance of medical nutrition and hydration, contending that the similarities among all acts of providing nutrition and hydration are so great that it is impossible to distinguish their recipients (e.g., dying patients from others) or their methods (e.g., a gastrostomy from normal feeding). Such acts are not only means to the ends of sustaining life and providing comfort; they also express the values of care and compassion. However, it may be morally odd to view actions as symbolizing and expressing care when they violate the patient's interests (and thus the principles of beneficence, nonmaleficence, and autonomy). This moral oddity is particularly evident in cases where physicians start and continue intravenous lines but at a rate that will result in dehydration over time (Micetich, et al., 1983); it is possible to follow this approach only by failing to acknowledge that the patient will become dehydrated and malnourished while the IV line maintains a fiction and expresses a symbol.

Finally, concern about symbolic actions also leads several critics to hold that acceptance of withholding and withdrawing medical nutrition and hydration, even in legitimate cases, will lead to terrible consequences. For example, according to Mark Siegler and Alan Weisbard (1985), "Compassionate calls for withdrawing fluids in a few selected cases bear the seeds of great potential abuse....Continuing fluids, even to dying patients, provides an important clinical, psychological, and social barrier that should be retained." Fears about the removal of this barrier focus on a movement or slide from actions in accord with the patient's interests to actions in accord with the society's interests, from the patient's quality of life to the patient's value for society, from dying patients to nondying patients, from letting die to killing, from cessation of artificial feeding to cessation of natural feeding, etc. While some of these fears are exaggerated, some of them have to be taken seriously because of the new threats of under-treatment as a result of cost-containment measures in contrast to the earlier threats of overtreatment. There is a danger that the "right to die" may become the "duty to die," even against the patient's own wishes and interests (Callahan, 1983). But it is not clear that this danger can be avoided only by mandating artificial nutrition and hydration in all cases, that is, by adding an external limit to the limits set by the principles back of and criteria involved in distinguishing obligatory and optional means of treatment.

As Cases # 1, 2, and 4 suggest, in addition to symbolic actions, another major issue of line drawing is the connection of judgments about one level of care or about one technology to judgments about others. This issue is evident in debates about policies regarding cardiopulmonary resuscitation, which are particularly important because "cardiac arrest occurs at some point in the dying process of every person" (President's Commission, 1983). Hence, it would be possible to use CPR in an attempt to prolong, at least briefly, the lives of most patients who die in hospitals. Although death is certain unless CPR is administered promptly, there is debate about whether the success of CPR should be measured by immediate or long-term results and whether the long-term results warrant CPR in as many cases as it is currently used, e.g., on cancer patients (Bedell, et al., 1983). Policies regarding CPR have emerged in some independence of other policies about life-sustaining technologies, such as respirators, in part because health care professionals, as in Case # 1, view not providing CPR as withholding rather than withdrawing treatment. Decisions to provide-- and often decisions not to provide-- cardiopulmonary resuscitation are made without advance consultation with patients or their families (see Bedell and Delbanco, 1984; Angell, 1984; Evans and Brody, 1985; Lo, et al., 1985). No adequate justification has been given for viewing decisions about CPR in hospitals as different from decisions about other life-sustaining technologies. Furthermore, it is often unclear to hospital staffs, as well as to patients and their families, what orders not to resuscitate imply, if anything, about other levels of care and other technologies. For example, some patients with DNR orders still receive chemotherapy, surgery, and admission to the ICU, while others receive no supportive care (Evans and Brody, 1985). It may be appropriate to indicate very concretely what will be provided in case of cardiac arrest and which medical and supportive efforts will be continued and which will not after a DNR order has been given.

In Case # 5, "a 79-year-old widow had had recurrent exacerbations of congestive heart failure and chronic obstructive lung disease. During hospital admission three months previously, she had required intubation and mechanical ventilation. On discharge from the hospital, she had 'absolutely refused' to be intubated ever again. She was readmitted to the hospital for five days for another exacerbation. Only two days after being discharged, she was readmitted to the hospital. She repeated her wish not to be intubated, although she was willing to receive basic CPR if necessary. Pseudomonas pneumonia, oliguria, and episodes of ventricular tachycardia developed. On the 21st hospital day, she said that intubation 'might be considered.' When lucid, she sometimes 'wasn't sure' about intubation, and, at other times, the patient did not want intubation. On day 25, shock, hypoxia, and obtundation developed. Because there were potentially reversible causes for the deterioration of her condition, the physicians intubated her, administered pressor agents, and transferred her to the intensive care unit. On the 31st day, she responded unambiguously and consistently with head nodding that she wanted mechanical ventilation and maximal care. Her condition worsened; on day 40, she was comatose and still required mechanical ventilation and pressor therapy. The physicians judged that no reversible disease was present. With the concurrence of her son, treatment with pressor agents [was] discontinued, a DNR order was written, and she was allowed to die" (Lo and Steinbrook, 1983).

This case illustrates some of the moral and practical difficulties in respecting patients' wishes and meeting their needs, and it indicates some of the difficulties in drawing lines (a) between DNR, limited or partial or slow codes, and full codes, and (b) between decisions about CPR and other life-sustaining treatments. It is possible to argue that, when a patient's wishes and interests are considered, important distinctions can be drawn regarding levels and types of care, both within CPR and between CPR and other treatments. However, these distinctions cannot be assumed to hold in all cases, because, if the above discussion is correct, no medical treatments as such are always obligatory; whether they are obligatory or optional in a particular case is a judgment call based on the patient's wishes and interests in the context of a (just) allocation of societal and hospital resources as well as social rules to prevent bad consequences.

B. Major Considerations in a Typology of Withholding and Withdrawing Life-Sustaining Medical Treatment

In proposed and possible typologies of withholding and withdrawing life-sustaining medical treatment, the following issues are among the most important (see Childress, 1981):

a. How is death brought about?

b. Who brings it about?

c. Who decides?

d. Why is death brought about?

The major distinctions to this point have focused primarily on how death is brought about. Although "euthanasia" is sometimes defined by its etymological traces (from the Greek, eu + thanatos = good or easy death), its more common contemporary usage denotes "mercy killing." There are also disputes about whether in both suicide and euthanasia, the death must be brought about actively or whether it may also be brought about passively. The terms "active euthanasia" and "passive euthanasia" are sometimes used and are certainly more common than the terms "active suicide" and "passive suicide." The other issues raised in the previous section, especially direct and indirect effects and ordinary and extraordinary means, are also relevant to possible typologies of withholding or withdrawing life-sustaining technologies.

Despite some overlap, there is an important distinction between who acts and who decides. Some analysts ignore the distinction between agents in acting in order to concentrate on agents in deciding; thus, Mayo (1983) insists that "voluntary active euthanasia is assisted suicide," and Tonne (1979) suggests that the term "suicide" should be replaced by the term "autoeuthanasia." However, it is important to preserve the distinction in final agency as well as in decision-making; who acts is important when we distinguish suicide from other actions. The line between "assisted suicide" and "voluntary, active euthanasia," both involving killing, is determined by who is the final actor, the patient or someone else. However, the question of who decides remains important in cases of "euthanasia" or "mercy killing," which may be voluntary, nonvoluntary, or involuntary from the standpoint of the patient.

Finally, there are the grounds of the decision, the why of the decision, whoever makes it and whoever carries it out. The major distinction is between patient-regarding reasons and other-regarding reasons, the former concerned with the patient's interests, the latter with the interests of others, such as family or society. These reasons are not always incompatible, but possible and probable tensions should be noted, particularly when a decision is made by someone other than the patient for the interests of parties other than the patient. Thus, it may be necessary to develop procedures to protect patient decision-making and patient wishes and interests (as discussed elsewhere in OTA's study).

There are too many factors and variables in decisions about withholding or withdrawing life-sustaining treatments to permit tight and illuminating typologies, but the above considerations identify themes that are important for describing and evaluating various acts, some of which will also appear in the discussion of suicide and its distinction from and relation to the refusal of life-sustaining treatments.

C. Definition of Suicide and its Application to Cases of Elderly people Receiving Life-sustaining Technologies

There is no clear, neutral, widely-accepted definition of "suicide." Suicide is always defined within traditions that make normative as well as conceptual points-- the definitions are intended to guide behavior. For example, some traditions hold that suicide is always wrong and then sharply distinguish acts of suicide from other acts that lead to one's own death, while other traditions hold that suicide can be justified under some circumstances and thus do not worry as much about the line between suicide and other acts that cause one's own death. Justified exceptions to a rule prohibiting suicide within one tradition may be built into the definition of the rule in another tradition.

Many definitions are efforts to offer necessary and sufficient conditions of a concept, such as suicide. However, in cases of "open-textured" concepts, it may be possible only to present what Wittgenstein called "family resemblances" in a list of criteria for the application of the concept. Before taking the latter route, it may be possible to identify some necessary conditions before encountering the rough edges of the concept of suicide. At the very least, the concept of suicide involves (a) a person's death, and (b) that person's involvement in his/her death. For an act to be considered a suicide it is necessary for a person to have intentionally brought about his or her own death, but these criteria are not sufficient to define suicide.

The questions and distinctions developed in the previous section suggest some key points: Who decides? In suicide, the one whose death is brought about makes the decision for death. Who acts? In suicide, the final actor, however much assistance is involved, is the one whose death is brought about. In Case # 6, Ida Rollin, 75 years old, suffered from ovarian cancer, and her physicians indicated that she had only a few months to live, that chemotherapy would not arrest the cancer, and that her dying would be very painful. The chemotherapy made her bald and resulted in perpetual nausea and vomiting. She indicated to her daughter, Betty Rollin (1985), that she wanted to commit suicide and asked for her assistance in making it as efficient and as painless as possible. The daughter secured the pills and passed on a doctor's instructions about how they should be taken. When the daughter expressed reservations about what they were doing, her husband reminded her that they "weren't driving, she [Ida Rollin] was" and that they were only "navigators." As these metaphors suggest, in suicide, the person whose death is brought about both decides and acts. If the agent did not decide and act voluntarily, that is, apart from coercion by others, her act of killing herself is not an act of suicide (on the criterion of noncoercion, see Beauchamp, 1980). Nevertheless, there are disputes particularly about the intentionality of the act (some of these will be discussed under the heading of _why_ is death brought about). At the very least, knowledge that an action will probably bring about one's own death is usually sufficient for suicide. Kluge (1976) distinguishes "suicidal act" from "acts of suicide." In suicidal acts, such as excessive smoking, drinking, or other risk-taking, an agent may know that his acts will probably result in his death, but this knowledge, along with his voluntary action, does not constitute an act of suicide. In acts of suicide, the agent must also intend to bring about his or her own death.

How is death brought about? In some traditions, when the death is brought about by letting nature take its course rather than by killing, by indirect rather than by direct means, and by forgoing "extraordinary" rather than "ordinary" procedures, the act is not considered suicide, especially if death from disease is inevitable and imminent whatever is done. In general, the more active the means of bringing about death and the closer the temporal association between the action and the death, the more likely the death is to be considered a suicide. Thus, several factors enter in some traditions to distinguish some refusals of treatment from acts of suicide: (a) whether the person is already terminally ill so that death is inevitable whatever is done and may be attributed to the underlying disease (i.e., nature or God's providence) rather than to the action; (b) whether the death is imminent regardless of what is done; (c) whether the means of death are active rather than passive and involve action rather than omission; (d) whether the death results fairly quickly after the action or omission; etc. Intuitions about these factors play a role in the application of the somewhat negative concept of suicide rather than the neutral concept of refusal of life-sustaining treatment. For example, as Tom Beauchamp (1980) notes, "to the extent that we have unmistakable cases of actions by an agent that involve an intentionally caused death using an active means where there is a nonfatal condition, the more inclined we are to classify such acts as suicides; whereas to the extent such conditions are absent, the less inclined we are to call the acts suicides."

Case # 7: When Barney Clark at age 62 became the first human to receive a permanent artificial heart on December 2, 1982, he also was given a key that he could use to turn off the compressor if he wanted to die. As Dr. Willem Kolff noted, "If the man suffers and feels it isn't worth it any more, he has a key that he can apply.... I think it is entirely legitimate that this man whose life has been extended should have the right to cut it off if he doesn't want it, if life ceases to be enjoyable...." (Rachels, 1983). Although there would have been vigorous debates about the characterization and evaluation of Clark's actions if he had used the key to end his life, according to most of the criteria that have been identified, it appears that his act should have been characterized as a suicide without necessarily prejuding its morality. According to some traditions, however, it is not possible to characterize an act as a suicide without simultaneously judging it negatively. For such traditions, the most likely response of those who viewed the action as morally acceptable would be that the artificial heart was experimental and extra- ordinary and that Clark simply acted to end an experiment or terminate an extraordinary treatment.

Why is death brought about? Although Margolis (1975) insists that suicide should include only "the deliberate taking of one's life in order simply to end it, not instrumentally for any ulterior purpose," others hold that suicide may be instrumental. It seems odd to limit the intention and motivation in the way Margolis proposes, since one may end one's life simply to end it, to avoid further pain and suffering, to protect the family's resources, etc. It is useful to distinguish two types of acts of suicide or attempted suicide (a similar distinction would apply to refusals of treatment). Following Max Weber (1967), we can call them "goal-rational" (*zweckrational*) and "value-rational" (*wertrational*) or, following David Wood (1980), we can call them "instrumental" and "expressive." In goal-rational or instrumental conduct, an agent attempts to realize some goal or end and to bring about some effect or consequence. In suicides of this type, the language of cause and effect, effectiveness and efficiency, is very important; for example, an agent may attempt or commit suicide because of his belief that death is better than his current or prospective life of pain and suffering or disability. In expressive acts of suicide-- often attempted rather than actual-- an agent conveys a meaning or makes a statement, such as a lack of hope or contempt for life. Some acts of attempted or successful suicide may be both instrumental and expressive.

For example (Case # 8) Jo Roman, a sixty-two year old artist, committed suicide on June 9, 1979 for both expressive and instrumental reasons. Having learned in March, 1978, that she had breast cancer which had spread to her lymph nodes, she underwent 10 months of chemotherapy before stopping and deciding to commit suicide. She finished a book on "Exit House" to argue for a social agency to ensure nonintervention and possible cooperation in "gentle" suicide for the old or terminally ill who want to end their lives, and she videotaped a session on "self-termination" for use on public television. With the help of her family and friends, she fashioned her "life sculpture"-- a pine coffinlike box filled with personal mementos, and then she wrote a farewell letter to 60 friends, said goodby to her family, and swallowed 35 sleeping pills, washed down with champagne. Her family and friends cooperated. She committed suicide for instrumental reasons (she believed that death was better than suffering from cancer and chemotherapy and in order to publicize her goal of Exit House) and for expressive reasons (she wanted to express her beliefs about "self-termination" and her conviction that "life can be transformed into art"). (Incidentally, an autopsy indicated that her cancer had not spread beyond the lymph nodes to any vital organ.) [This case was drawn from articles in The New York Times, June 17, 1979, and Newsweek, July 2, 1979.]

An agent's motives may also be distinguished according to whether they are other-regarding (i.e., undertaken to benefit others, especially to save lives) or self-regarding (i.e., undertaken to benefit oneself, e.g., by avoiding pain and suffering). Some traditions tend not to characterize sacrificial acts as suicide, e.g., when a soldier falls on a grenade in order to save the lives of his comrade. Sometimes this distinction also reflects the rule of double effect; for example, Catholic moral theologians view the death as one that is accepted as a risk rather than intended or sought (see Task # 2). However, there are limits; in case # 2, even if Mr. R had been able to secure and take the lethal medication himself, rather than having it administered by his physicians, his act would have been a suicide despite his other-regarding reason of not wanting to deplete his family's resources. And, of course, motives may be and usually are mixed. For sacrificial actions and in part for refusals of treatment, Beauchamp (1980) argues that the issue is whether "death is caused by conditions not specifically arranged by the agent for the purpose of bringing about his or her own death." If the agent did not specifically arrange the conditions to bring about his or her own death, he does not commit suicide in dying for others.

D. Analysis of Cases to Illustrate Distinctions and Categories

The eight cases already presented in Task # 1 depict typical problems and also illustrate important distinctions, e.g., between suicide and other modes of refusal of treatment.

E. Normative Implications of These Distinctions

The normative implications have necessarily been largely interwoven in the conceptual analysis because most of the concepts themselves have been developed to reflect values. At each point, evaluative issues and debates were identified, and suggestions were offered for their resolution. Basically, the various distinctions regarding the termination of life-sustaining technologies-- withholding and withdrawing; direct and indirect effects; killing and letting die; and ordinary and extraordinary means of treatment-- were developed to express important moral principles and values. Focusing on these distinctions is useful but also potentially misleading unless attention is also paid to the underlying principles and values that may not be adequately expressed in the distinctions under new circumstances, including new technologies to sustain life. These principles and values (see p. 1) establish a presumption in favor of life-sustaining treatments, particularly that life is in accord with the patient's interests and wishes. But this presumption can be rebutted in many cases by appeal to the same principles. The various distinctions are largely (but not completely) attempts to indicate the limits on the obligation to prolong life by available technologies and to set limits on how death may be brought about. Most of the distinctions indicate when actions that result in death do not constitute violations of the principle of nonmaleficence and are justified by other considerations. However, the distinctions do not provide moral answers but point to relevant moral considerations, which are sometimes obscured by concentration on the distinctions. For fuller reflection on their value and deficiencies, see section A above.

Task # 2. Description of Important Ethical Traditions Relevant to Withholding or Withdrawing Life-Sustaining Technologies and/or Suicide

This section will examine the traditions that are particularly relevant for interpreting actions in the pluralistic society of the USA; these traditions may also set limits on what is acceptable and feasible in public policies. For each of these traditions, it is important to identify its conception(s) of a "good" death and the appropriate actions to secure or permit such a death. The distinctions that have already been developed will be used to offer concise expositions of these traditions, which fall into three main groups.

First, there are the major religious traditions that are influential in the USA: Catholicism, Judaism, and Protestantism. It is not unimportant that they share the Hebrew Bible or Old Testament as one of their important authorities, since this scriptural source shapes part of their conception of God, his relation to the world, human life, and death. However, it is not their only authority, and there are important differences not only among three major traditions that are part of what is sometimes called the "Judeao-Christian" tradition, but within each of these traditions. However, decisions about life and death within these three major traditions are shaped in part by a fundamental perspective: God directly or indirectly is in control of life and death and His will, whether expressed through revelation or natural law, should be respected. In general, a good death is one that occurs within the context, including the moral limits, set by this perspective. As Battin (1982) notes, many of the religious arguments against suicide (and, one might add, against mercy killing) draw on analogies, usually between God and human life, on the one hand, and ordinary relationships, on the other. Many of these analogies involve property relationships (e.g., life is a gift or loan from God) and/or personal or role relationships (e.g., human beings are God's children, servants or sentinels). These are sometimes combined with natural law arguments, as in Roman Catholicism. In general, it is fair to say that these three religious traditions rule out suicide (in most circumstances) and also active euthanasia or "mercy killing" (in most circumstances) (Larue, 1985).

For Judaism, the discussion of suicide and euthanasia, and conceptions of good life and death, must be placed in the context of an active, willing deity's relation to the world and the human beings within it. Human life receives its value from God, who grants it as a gift and who alone can take it away (Siegel, 1979). Through its rejection of suicide, Judaism "affirms its high valuation of life and its belief in the sovereignty of the Creator" (Siegel, 1979), who can sustain human hope; suicide is a denial of God's providence. The texts in the Hebrew Bible that records instances of suicide, such as Samson and Saul, do not explicitly condemn them, and the prohibiton of suicide is derived not from the Decalogue ("Thou shalt not kill") but from Genesis 9: 5, which prohibits the shedding of human blood because human beings are created in the image of God. The Talmud holds that the duty to protect human life takes precedence except where murder, sexual immorality (i.e., incest or adultery), or idolatry would be required in order to protect it. Indeed, the duty to protect life takes priority over other religious duties such as keeping the Sabbath holy. According to some Rabbinic texts, Saul's suicide was undertaken in order to avoid profanation of God (Seigel, 1979). Similarly, martyrdom is acceptable under some circumstances, as an affirmation of faith in rather than a denial of God. The rules for rituals of mourning and internment exclude the person who has committed suicide. However, as in other traditions, the critical question is which acts are counted as acts of suicide, as "real suicides." The key criterion is willfulness, and the tradition has developed such detailed rules of evidence for wilfullness "that for all practical purposes almost all suicides are treated as individuals who destroyed themselves 'unwillfully'" (Siegel, 1979) and they are accorded the usual rites for the dead. In effect, some deaths that would otherwise be counted as suicides are removed from that category because of the lack of sufficient evidence of willfulness; since there is a presumption that no one would willfully commit suicide and deny God's sovereignty, the burden of proof to establish suicide is high. Even the presence of fear of pain and suffering, for example, may be sufficient to deny willfulness and excuse the agent by removing the condemnatory label of suicide; by contrast, avoidance of murder, sexual immorality, or idolatry could justify the act of suicide.

In general, the Jewish tradition has ruled out mercy killing on the same grounds as suicide; as Maimonides wrote, "He who kills, whether [the victim] be a healthy person or a sick person approaching death, or even a patient already in his death-throes, is treated as a capital criminal" (quoted in Jakubovits, 1978). The tradition has also held that it is not permissible to do anything that might hasten death, but it has permitted removal of anything that might artificially prolong dying, i.e., prevent the soul from departing.

Regarding the dying person (goses), whose death is thought to be imminent (within three days, according to some authorities), the tradition has required that such a person be treated as a living person in all respects and that nothing be done that might hasten his death, e.g., closing the patient's eyes or removing a feather pillow from under his head. After excluding mercy killing, a major text in the tradition says of the dying patient: "Still you may not put salt on his tongue to keep him alive longer." It also notes that "if a person is dying and someone near his house is chopping wood so that the soul cannot depart, then one should remove the (wood) chopper from there" (Rosner, 1972; Weisbard, 1979). The important distinction is between actively hastening death, which is prohibited, and removing impediments to death, which is permitted (Weisbard, 1979). Of course, it always been easy to extend the principles and rules embodied in the tradition to new conditions occasioned by technological developments, such as the respirator and artificial nutrition and hydration. The extension has occurred through analogical arguments. Even though direct killing and hastening death are ruled out by the Jewish tradition, there are debates about appropriate withdrawal and withholding of life-sustaining treatment. There are both stringent and lenient interpretations. On the grounds of the sanctity of life, some rabbinic authorities "will not allow any relaxation of efforts, however artifical and ultimately hopeless, to prolong life" (Jakobovits, 1978, p. 801); others allow withholding or withdrawing "heroic methods" that only prolong dying. In general, the tradition appears to give strong support to viewing respirators as heroic under some circumstances, but there are more debates about antiobiotics and artificial nutrition and hydration. Some interpreters hold that the principles, rules, and precedents in the Jewish tradition permit termination of antibiotics in some circumstances, but they are less sure about artificial nutrition and hydration, which, some hold, might be distinguishable from ordinary, natural means of sustenance (Jakobovits, 1978; Weisbard, 1979).

A few other points will complete the main contours of Jewish thought and practice on these matters. First, the Orthodox, Conservative, and Reform Jewish traditions differ in part according to their approach to the Jewish tradition, the Orthodox concentrating on the rules, the Conservatives emphasizing that the proper interpretation of the rules depends on attention to the principles or values back of the rules, and the Reform tradition stressing the principles or values, such as respect for persons or autonomy, rather than the rules. Obviously, their approaches to the major rules and principles discussed above will differ accordingly. Second, there are, nevertheless, the rudiments of a conception of a good death as one that occurs in accord with the divine will and providence. Since the Jewish tradition has not emphasized a sharp distinction between spirit and body, it has not been tempted to view suffering as positive or to view medical care as "flying in the face of providence" (Jakobovits, 1978, p. 793). There is a duty to prolong life, but not to prolong dying. (Of course, there are duties to a corpse, but not duties to prolong the functioning of its bodily parts; however, disputes about the meaning and criteria of death are beyond the scope of this report.)

The Roman Catholic tradition has also prohibited suicide, using both analogical arguments and natural-law arguments. For example, Thomas Aquinas (ET, 1981) argued that "life is God's gift to man, and is subject to His power, Who kills and makes to live." Suicide is a "mortal sin" because it is "contrary to the inclination of nature and to charity whereby every man should love himself." Finally, through the act of suicide the agent injures the community of which he or she is a part. Thus, suicide is an offense against the self, nature, society, and God. In general, because of a conviction drawn from the New Testament that it is never right to do evil that good might result, official Church teachings and Catholic moral theologians do not justify acts of suicide. However, as in Judaism, there is a difference between a moral and a pastoral response; the religious-moral condemnation of acts of suicide does not translate into an unqualified negative pastoral response after apparent acts of suicide, in part on grounds of limited peronsal responsibility.

More significantly from a moral standpoint, the Catholic Church has managed to accommodate some conflict situations, not through excusing agents (the pastoral response) or justifying suicide, but through a clarification of the meaning of the prohibition of acts of suicide so that it does not include some self-sacrificial acts that are instances of charity or neighbor-love. Hence, some acts that might otherwise appear to be acts of suicide are held not to fall under the prohibitive rule. This response to a conflict situation is drawn from the doctrine of double effect (discussed briefly under Task # 1); according to this doctrine, a soldier who falls on a grenade to save his comrades performs a sacrificial, heroic, or charitable act rather than a suicide, because the action itself (falling on the grenade) is morally good or neutral, the evil effect (one's own death) is foreseen but not directly intended, the evil effect (one's own death) is not a means to the good effect (saving the lives of others), and there is sufficient reason (saving the lives of others) to allow the evil effect (one's own death) to occur. This doctrine of double effect has been criticized both inside and outside Roman Catholic thought. Several moral theologians have replaced it by a doctrine of proportionate reason, but it still holds sway in official Church teachings. When suicide is viewed as intrinsically evil and the doctrine of double effect is used, very few cases other than martyrdom and some self-sacrificial acts would escape the prohibition against suicide; certainly killing oneself to stop pain and suffering from terminal illness, to avoid a poor quality of life, or to reduce the burden to others, would not qualify as justified "exceptions" to the rule.

The Catholic Church has introduced other distinctions, some of which have permeated public consciousness and policy, to permit actions that might appear at first glance to be ruled out by the principle of the sanctity of human life drawn from convictions about God's revealed will and the natural law. First, even though Catholicism has praised suffering for its educative and spiritual value more than Judaism has, and even though it has recognized that voluntary moderation of the use of painkillers may be a conscious association with Christ's sufferings, it has emphasized that "it would be imprudent to impose a heroic way of acting as a general rule" (Sacred Congregation, 1980). The rule of double effect also permits the use of medications to relieve pain and suffering even when their use will hasten death, a foreseen but unintended consequence (see the discussion under Task # 1).

Second, Catholic thinkers developed the distinction between ordinary and extraordinary means of treatment to indicate the limits of the obligation to prolong life; if a patient does not use extraordinary means of treatment, his/her refusal is not tantamount to suicide, and if a professional or a family member withholds or withdraws extraordinary means in accord with a competent patient's wishes or an incompetent patient's best interests, it is not mercy killing (euthanasia). It is not obligatory for patients to accept or for professionals and families to offer and provide all means of treatment that might sustain life at least briefly: Means that are futile or useless or that produce burdens that outweigh their benefits are "extraordinary" or "heroic," and their use is optional, not mandatory (Kelly, 1950; 1951; Sacred Congregation, 1980).

Thus, the Catholic moral tradition permits withholding or withdrawing life-sustaining treatments, such as the respirator in the Quinlan case. The decision may be made by the patient himself/herself or by a proxy as long as the guidelines of the ordinary/ extraordinary distinction are followed.

As we saw earlier (under Task # 1), there is controversy about these guidelines, particularly about what may be included under the calculus of proportionality, the calculus of benefits and burdens-- for example, whether the anticipated poor quality of the patient's life (rather than the burdens of the medical treatment) may be counted as a burden or whether the anticipated poor quality of the patient's life may constitute such a limited benefit as to make further treatments optional even though the life could be sustained indefinitely (McCormick, 1978). In part the issue is whether the categories can be applied to those who are not irreversibly dying. There is also debate about whether all medical treatments that sustain life can be brought under the category of extordinary means of treatment depending on the patient's circumstances. In recent years, this debate has focused on medical nutrition and hydration; many, but by no means all, Catholic commentators hold with John Kelly (1951) that even medical nutrition and hydration may be optional under some circumstances (McCormick, 1985). (For further analysis of the distinction between ordinary and extraordinary means of treatment, see Task # 1.)

It is important to emphasize that the distinctions between direct and indirect effects of actions and between ordinary and extraordinary means are designed not to justify either suicide or mercy killing, but to deny that some acts that appear to fall under the prohibition of the killing of an innocent person (which rules out both suicide and mercy killing) are in fact covered by them. Euthanasia, understood as "an action or an omission which of itself or by intention causes death, in order that all suffering may in this way be eliminated," is intrinsically wrong as the direct killing of an innocent person (Sacred Congregation, 1980).

Along with suicide it is wrong because of its intentions and methods. A "good" death in the Catholic context is thus one that through intention and methods is in accord with the divine will as expressed in scripture and in the natural law. For most people it will be a death that is as free as possible of pain and suffering, short of active killing; however, for some people who choose a heroic way in accord with Christ's sufferings, it may involve conscious reduction of painkillers. It is not a good death if it involves killing, whether by oneself or by others; such killing constitutes a mortal sin.

Even though Catholicism is more diverse than it was before Vatican II, it is still more uniform, at least in its official teachings, than either Judaism or Protestantism. It is rarely possible to identify _the_ Protestant stance on any matter of significance, since _Protestantism_ encompasses so many different denominations and stances from fundamentalism to liberalism. On the whole, Protestants tend to take a more individualistic approach to decisions about life and death than either Catholics or Jews. Even Protestants who emphasize rules drawn from scripture (revealed morality) are often supicious of the kind of detailed casuistry that they see in Catholicism or Judaism. Some Protestants fear that through casuistry people may believe that they can avoid sin and become righteous instead of recognizing that they are inevitably sinful and must accept God's righteousness (justification by faith). Hence, with such exceptions as Paul Ramsey (1970; 1978), Protestants are less likely to develop the sorts of detailed distinctions that appear in Catholicism and Judaism.

Regarding suicide, some Protestants contend that it is wrong because it violates biblical rules that prohibit killing; others (e.g., Karl Barth and Dietrich Bonhoeffer) hold that it is wrong because it displays a lack of trust in and faithfulness toward God. However, in general, Protestants are less likely to make the prohibition of suicide absolute than are Jews and Catholics. For some Protestants it appears to be prima facie rather than absolutely wrong, its actual wrongness depending on various circumstances. For example, reflecting the debate about the Van Dusens' joint suicide (see Case #10), a pastoral letter of the Presbytery of New York City in 1976 concluded that "it is clear that for some Christians, as a last resort in the gravest of situations, suicide may be an act of their Christian conscience" (Battin and Mayo, 1980).

Two of the most influential and prolific Protestant writers in biomedical ethics are Joseph Fletcher (1954; 1967; 1979) and Paul Ramsey (1970, 1978). Fletcher defends both suicide and active euthanasia, but Ramsey rejects both of them while accepting a wide range of treatment refusals limited by the kinds of considerations that appear in the Catholic doctrines of double effect and ordinary/ extraordinary means of treatment. In his earlier writings Fletcher based his argument for suicide and active euthanasia on personalism and asked which actions would respect persons. In his later writings he based his argument on utilitarianism and asked which actions would maximize human welfare. Explicit theological convictions play only a modest role in his later writings, which also emphasize criteria of quality of life stated in terms of humanhood.

By contrast, Paul Ramsey rules out both suicide and mercy killing-- though he appears to recognize some exceptional borderline cases. Ramsey affirms certain limits on the refusal of life-sustaining treatment by _competent_ patients; the individual's will does not always triumph, and paternalistic interventions are sometimes justified to protect the patient's best interests. In decisions about _incompetent_ patients, Ramsey opposes all judgments about quality of life; for him what is important in the ordinary/extraordinary distinction can be "reduced almost without significant remainder to a medical indications policy" (Ramsey, 1978, p. 155). Thus, to determine which treatment is obligatory and which optional for incompetent patients, it is sufficient to determine which treatment is medically indicated and which is not. For the _dying_ patient, the relevent choices are between further palliative treatments and no treatments. For unconconscious or incompetent _nondying_ patients, regardless of their quality of life, there is an obligation to use the treatment that is medically indicated. Ramsey's fear is that we are sliding toward a policy of active, involuntary euthanasia for unconscious or incompetent nondying patients. Against such a policy, he asserts an "undiminished obligation first of all to save life and in the second instance, to use palliative treatments where possible" (1978, p. 165). Above all, he rejects any quality-of-life judgments because they violate the principle of equality of human lives, drawn from God's creation of human beings in his image and his indiscriminate care for all.

Another Protestant theologian, Arthur Dyck (1977) rejects euthanasia on the grounds that mercy or kindness includes both not harming (killing) and benefitting others and that not harming takes priority over benefitting others. Against arguments for beneficent euthanasia by such humanist thinkers as Marvin Kohl (see below), Dyck proposes an ethic of "benemortasia," which would extend the following kinds of care to patients whose death is imminent: relief of pain and suffering, respect for the right to refuse treatment, and provision of health care without regard for ability to pay. Some would argue, against Dyck, that death is not always a net harm even if it is always a harm and that killing may express mercy and kindness in particular circumstances, but some of them and others find arguments against euthanasia convincing if they are stated in terms of rules of practice rather than acts that are always wrong. Still other Protestants focus on the character of agents and reject both suicide and euthanasia because of what they symbolize and express about agents, either individuals or communities (Hauerwas, 1981).

Before turning to other religious and secular positions, it should be noted that while suicide is generally prohibited by all three major strands of the Judaeo-Christian tradition, their adherents have different rates of suicide. At least since E. Durkheim's (1897; ET 1951) famous study of suicide in the late nineteenth century it has been observed that on the whole Protestants have a higher rate of suicide than Catholics, who in turn have a higher rate of suicide than Jews. This pattern still holds (Miller, 1979); its explanation is complex since it does not depend on either the prohibition of suicide or sanctions against suicide (e.g., a mortal sin) but rather, Durkheim argued, on the degree of integration of individuals into the community. Protestantism tends to be more individualistic than either Catholicism or Judaism. Because Durkheim focused on the degree and intensity of social integration, he paid less attention to the individual's commitment to as well as the content of religious beliefs; some recent studies note secularization of beliefs among individuals who adhere to these religious traditions (Sheidman, 1976). Other studies (Jacobs, 1982) suggest that religious beliefs may structure the justifications that people who commit suicide offer in their notes to survivors, particularly in order to resolve the moral prohibition of suicide and to keep open the possibility of a happy afterlife. Some recent studies have found more tolerant attitudes toward suicide among Jews, followed by Protestants, and then Catholics, but they also recognize the role of several personal factors, including the strength of the religious ties (Minear and Brush, 1980).

It would also be useful to have studies of variations in refusal of life-sustaining treatment among the adherents of these traditions. Since the principles developed in these traditions apply to professionals as well as to patients, it is also possible to examine their impact on professional practices. In a study that was conducted in 1970-71 before some major changes had occurred in public policies toward the withdrawal of life- sustaining treatment, Diana Crane (1975) found that liberal Protestant physicians were the least inclined to be activists, i.e., to undertake heroic measures to prolong patients' lives, while Jews were the most inclined to be activists. She found that these tendencies persisted even among people who identified with these traditions but who were not very religious.

The secular traditions of libertarianism and humanism reject the theistic context that structures so much of the argument against suicide and mercy killing and for certain allowed deaths in Jewish and Christian religions, and they tend to reject the kinds of distinctions that evolved in those religious traditions to express the limits of the obligation to prolong life. The good life and the good death will express those human qualities that these secular traditions emphasize. In general, libertarians recognize and respect a person's autonomous choices as long as they do not harm others; those choices may legitimately include suicide and mercy killing along with refusals of life-sustaining treatment. Libertarians may also argue for eliminating the legal prohibitions against assisted suicide (Engelhardt, 1985; Engelhardt and Malloy, 1982). Rights attach to persons, who may exercise them as they choose as long as they do not violate the rights of other persons.

Humanists tend to include but may not rely as completely on personal liberty and autonomy as libertarians. Whereas some libertarians view respect for autonomous choices (liberty) as the only moral obligation, humanists often recognize kindness or mercy as an obligation, not only as a praiseworthy action. For example, Marvin Kohl (1974; 1977), a humanist philosopher, argues that beneficent euthanasia (painless inducement of quick death resulting in benefit for the recipient) is a prima facie obligation because individuals and societies have a prima facie obligation to treat people kindly and because beneficent euthanasia is kind. Beneficent euthanasia is not limited to cases that involve a patient's request for or consent to euthanasia, the imminence of death, and the presence of pain. The patient's quality of life is a relevant and often decisive consideration.

Many humanists, especially those who emphasize utilitarian ethical considerations, may agree with Kohl (or even libertarians such as Engelhardt) about particular acts, but reject a rule or practice of assisted suicide or mercy killing, even to benefit and to respect patients who request death. They may be convinced that the overall consequences will be worse if society accepts assisted suicide and/or mercy killing than if it maintains its rule against them. Such an argument puts the libertarian and humanist considerations in a broader social setting with particular attention to the dangers of abuse and of the slippery slope (see Beauchamp and Childress, 1983).

Since arguments by religious thinkers are not necessarily religious at every point, some religious thinkers and groups-- some of whom might be described as "religious humanists"-- also recognize the validity of this sort of argument against a rule permitting assisted suicide and active euthanasia, either in addition to or in place of specifically religious arguments. Indeed, such secular arguments are often used in a pluralistic society, whatever other grounds a group may have for supporting rules against assisted suicide and active euthanasia, such as convictions about the intrinsic wrongness of the acts in question. It is rarely possible to argue directly from a conviction that an act is a sin (i.e., an offense to God) to a recommendation for a prohibitive policy.

Some other religious traditions are not as important numerically in the USA as the ones discussed earlier, even though they are as important to their participants. One of these is Islam, which has many affinities with Judaism and Christianity, sharing in particular the conception of a transcendent, active, willing deity, whose will must be followed. With Judaism and Christianity, the Koran notes that "It is not given to any soul to die, save by the leave of God, at an appointed time" (quoted in Smith and Perlin, 1978). This general principle has supported a prohibition against suicide, as has the tradition that the Prophet Muhammed refused to bury a person who had committed suicide. This principle also supports a prohibition of mercy killing. Some commentators hold that it is "tantamount to murder to hasten the death of a patient even when he sufers from endemic pains" (Abdul-Rauf, 1978), but since they also recognize that it is permissible and even obligatory to relieve pain, it is not clear whether they have a principle simlar to double effect. Although there is debate about the proper interpretation of the Islamic tradition, some Muslims hold that "the artificial prolongation of the life of a terminal patient who has permanently lost consciousness is morally unjustifiable" (Abdul-Rauf, 1978). As with Jewish and Christian approaches, the question about a good or appropriate death focuses on the divine will as expressed in commandments and providential actions.

Often misinterpreted and distorted by Western thinkers as putting little value on life in this world, the Eastern religious traditions have complex attitudes toward suicide. Early Indian religious traditions opposed suicide, but later Hinduism not only permitted but even commended the heroic sacrifice of the holy person (the sannyasin), usually by passive means, such as death by ascetic refusal to eat, rather than by active means (Smith and Perlin, 1978). Suicide by a widow (suttee) also developed in India. Early Indian Buddhism prohibited suicide, but later Buddhism also recognized the heroic renunciation of life through passive means. It is fair to say that "Buddhism does not necessarily prohibit suicide, but according to Buddhist sacred texts suicide is meaningless, for by resorting to suicide one cannot save oneself from the miserable condition of mundane existence (or transmigration); karma (actions) are supposed to accompany a person who has commited suicide even after his death" (Nakamura, 1978). In general, for both Hinduism and Buddhism, the attitudes displayed in action and nonaction and their effects on rebirth and ultimate release are critically important in the conception of a good death. The attitude toward suffering rather than suffering itself is central. (Some forms of suicide for honor also came to be praised particularly in Japan, where harakiri or seppuku has sometimes been chosen over a dishonorable death.) Less has been written about Hindu and Buddhist attitudes toward mercy killing, and attitudes toward refusal of life-sustaining treatment are still in evolution as these traditions confront the new problems occasioned by these technologies.

In conclusion, main religious traditions in the USA tend to oppose direct killing, whether in suicide or active euthanasia. However, they recognize some exceptions (often not considered suicides) and distinguish suicide and active euthanasia from treatment refusals or withdrawals, which are acceptable in many circumstances. In general, these religious traditions, often joined by humanists as well, defend the legal prohibition of assisted suicide and active euthanasia because of their worries about the negative consequences of permitting them, but they also support laws that allow competent individuals to refuse life-sustaining treatments for themselves and for incompetent patients, under some circumstances (they frequently disagree about the appropriate circumstances). They thus accept a legal right to die and to let die, but they usually oppose a legal right to kill and to be killed. However, significant minority voices in the religious traditions and numerous voices in the humanistic traditions support _acts_ of both assisted suicide and active euthanasia and _rules_ that permit them. These issues will be discussed in more detail in Task # 4, which focuses on prevailing concepts of assisted death.

But what a tradition says about suicide or refusal of treatment from the standpoint of either the individual agent or public policy may not enable observers to predict any individual's actions regarding suicide or refusal of treatment. Too many other factors, such as the individual's level of commitment to the tradition, may be important. Nevertheless, more studies are needed, particularly of expressed attitudes in these traditions and of correlations between religious beliefs and practices, on the one hand, and acts of suicide and refusal of life-sustaining treatments, on the other. In addition, studies are needed of the impact of religious beliefs and practices on families and professionals who must decide whether to withhold or withdraw life-sustaining treatments from incompetent patients. In any study, it is important to consider traditions as viewed and lived by their practitioners. For example, in many public discussions surprise is sometimes expressed about the latitude in decisions to withhold and to withdraw life-sustaining treatments in Roman Catholicism, which is widely viewed as "pro-life." But that latitude falls within the range of discretion allowed by the categories that have been developed in this tradition and that were discussed above.

Task # 3: Age-Specific Data on Suicide Among the Elderly

"People 60 and older represent 18.5 percent of the United States population, but commit 23.0 percent of all suicides" (Miller, 1979, p. 1). Despite such statements, there are major difficulties in obtaining accurate and helpful statistics about the incidence of suicide-- and also of refusal of life-sustaining treatment-- among the population at large and especially among the elderly. One source of difficulty that is common to all age groups is conceptual: exactly which acts count as acts of suicide? As we saw earlier, definitions of suicide tend to include the agent's intention along with the nature and circumstances of the act. Since "suicide" is not a theory-neutral or value-neutral concept, what counts as an act of suicide varies from theory to theory and value-system to value-system. Among the numerous other reasons for underreporting suicides, Miller (1979) identifies four as especially important: (1) not wanting to stigmatize survivors; (2) allowing survivors to collect larger life insurance benefits; (3) not being aware of the decedent's intentions because the family or friends destroyed or hid suicide notes; (4) the tendency of some coroners to certify a death as a suicide only when a note has been found (despite research findings that most suicides do not leave notes).

The moral opprobrium or stigma that clings to suicide in most communities-- in part because suicide appears to be an act of aggression against others or at least to signify the failure of others-- leads to two different efforts to deny that the agent committed suicide. First, there is an effort to deny that the agent was responsible for his or her acts; if the agent was not competent, did not understand what he or she was doing, or did not act voluntarily, he or she was not responsible, and however much the act resulting in death resembles "suicide," it was not finally an act of suicide. This interpretation appears in religious communities that operate with a distinction between moral and pastoral responses to suicide, affirming morally that suicide is wrong and often affirming pastorally that the agent was not responsible for his/her acts and thus did not commit suicide, a blameworthy act. This interpretation is supported in part by the common psychiatric view of suicide as the result of mental illness. One implication of this approach is to deny that people who attempt suicide are acting rationally.

Although the first effort has only subtle effects on the accuracy of suicide statistics, the second effort has a major impact and greatly reduces their reliability. It avoids the harm that might result from the label of suicide by not counting doubtful cases as acts of suicide. For example, some countries include "probable" suicide in their statistics, while others list such cases under the rubric "Cause of death unknown" (Brooke, 1974). Coroners differ greatly on the amount of evidence they require to view an act as one of suicide; for example, as mentioned above, some coroners insist on the evidence of suicide note, which statistically appears in less than half of the deaths currently counted as suicides and even less frequently in suicides by the elderly. In doubtful cases, it is often easier and less troubling to count the death as an "accident," rather than as a suicide, and yet studies indicate that many so-called accidents probably resulted from the agent's intention to die or to take or create a high risk of death.

Because suicide is generally viewed as a single act, rather than as a process (Miller, 1979, p. 18), it excludes such extended acts as noncompliance with a physician's orders regarding the use of medications or delaying medical treatment, which may be acts of slow suicide if they are undertaken by competent people with understanding and voluntariness. Some acts such as excessive consumption of alcohol or drug abuse may be suicidal acts without being acts of suicide (Kluge, 1975). Because acts of suicide are generally viewed as active rather than passive-- even though there are clear exceptions-- some refusals of life-sustaining treatment, particularly when death is imminent, would not be counted as suicide. Unfortunately, there are not, to my knowledge, any good statistics on refusals of life-sustaining treatment, as distinguished from suicide. Even though it is not difficult conceptually to distinguish suicide from active euthanasia because the final agency is different, it is more difficult to distinguish suicide from refusal of treatment in all cases.

In addition to these general reasons for the inadequacy of available statistics regarding suicide, some reasons apply specifically to the elderly as a group. Even though there are problems with the statistics, the statistics are clear and certain enough to establish some of their own limitations. As a group, elderly people who commit suicide tend not to communicate their intentions in advance or to leave notes; in addition, they tend to be successful (Miller, 1979).

Despite their limitations, the available statistics may be useful, if interpreted with carefully and cautiously. In general, suicide rates increase with age, and the rate of suicide is higher for elderly Americans than for any other age group (see Appendices; Miller, 1979; Sherman, 1980). It is important to note that the rate of suicide attempts among the elderly is roughly the same as the rate among younger age groups, but that the elderly succeed at a higher rate (Berdes, 1977, p. 26): their attempt-completion ratio is two to one, while the ratio is twelve to one for the general population. These figures suggest that the elderly attempt suicide to bring about death rather than to communicate with and control others. When suicide rates per 100,000 are examined by five-year age groups from 1933-1968 and 1972 (see Appendices), the increase in suicide rates as people grow older is clear. The increase is not totally even, since, in 1968, for example, there is an increase to age 55-59, a decline through 75, and another increase over 75. For most of the years covered by these statistics, the highest suicide rate is found in the group 75 and over. For those over 65, the suicide rate has usually been at least two and sometimes three times the national average for all groups (see also Sherman, 1980). (For further breakdown by age, see Appendices.) In 1975, of the 27,063 suicides certified across the USA, people 60 and older committed 6,228 of them (Miller, 1979).

However, in view of the incompleteness of the statistics and the probable underreporting of suicide for reasons indicated earlier, some have estimated that this figure for people 60 and older must be at least 10,000 (Miller, 1979).

Some long-term trends should be noted. First, the suicide rate among people over 65 declined gradually from 1950 to 1970; it has levelled off or declined slightly since 1970. There is debate about the cause of this decline, particularly since the suicide rates among younger people increased at the same time. Although most commentators identify several possible causal factors, many agree that the provision of increased social support as a right is a major factor in the decline of suicide among the elderly (Miller, 1979, pp. 2-3; Sherman, 1980). Second, because of the continuous increase in the number of elderly persons, there is also an increase in the number of elderly suicides, despite the decrease in the rate per 100,000 elderly persons. Third, the percentage of suicides within the total number of deaths for a cohort decreases with age. Even though the suicide rates increase with age, the death rates by all causes also increase; thus, suicides constitute a larger proportion of the total number of deaths for the young than for the elderly (Baechler, 1979).

Presented as statistics about the elderly as a group, the figures to this point are seriously misleading because they fail to distinguish specific groups among the elderly. Of particular importance are the differences between sexes and races: The high suicide rates among the elderly can largely be attributed to white males. As Miller (1979) notes, "It is only among white males that the suicide rate increases throughout the life cycle." The suicide rate for older white males is almost four times greater than the average for the US as a whole (Miller, 1979). In general, females attempt more suicides, males complete more suicides. This gap increases significantly among the elderly: For ages 65-69, males complete four to every one for females; by age 85, the figure is twelve to one (Miller, 1979, p. 3). This difference between elderly male and female suicides has been attributed to several factors, including the perceived decline in male independence and status through retirement, illness, loss, etc., but there is no consensus about these factors.

While non-white suicide rates are roughly equal to those of whites until age 35--and may even be higher for American Indians and blacks from ages 15-29 (Miller, 1979, pp. 4-5)--there is a substantial gap after that point (Sherman, 1980, p. 31). Some theorists attribute this difference to the greater relative deprivation of status, power, and influence experienced by aging white males through retirement, etc., since blacks have experienced greater absolute deprivation all through their lives. There is also some evidence that blacks in the US even acquire improved social status as they grow older (Butler and Lewis, 1973; Miller, 1979). Because of the major statistical differences between suicides by white males and others, most studies concentrate on white males.

What are the main characteristics of elderly suicides? In particular, do any characteristics reflect factors that are also significant in refusal of life-sustaining treatment, such as physical illness and poor quality of life? First, elderly suicides that are recognized as such tend to be committed by active and violent means that support claims of intentional behavior; typical acts are shooting, jumping, hanging, and drowning (Miller, 1979, p. 18). Suicide by gunshot is the most common.

Second, there is debate about the whether mental and/or physical illness is an antecedent and causal factor in elderly suicides. Some studies, as indicated earlier, suggest that mental illness is a primary factor in many elderly suicides (see Batchelor, 1957; Miller, 1979, p. 33; Robins, 1981). Yet there are widespread and vigorous debates about the meaning and criteria of mental illness. If a person is mentally ill, it is usually considered appropriate to intervene to stop the attempted suicide; if a person is not mentally ill (and satisfies other conditions), it may be more difficult to justify intervention to stop what might be considered a rational suicide by competent person acting with awareness and voluntariness.

Physical illness is often an antecedent factor in suicide; whether it is a causal factor is more difficult to determine-- i.e., whether the person committed suicide because of the physical illness (for one case in which physical illness apparently played a major role, see Case #9). The dispute has been summarized: "Some of the informants felt that physical illnesses had played important roles; others felt that they had played only minimal roles; still others were uncertain about their significance" (Robins, 1981). In one study, eighty-five percent of the people over 60 who committed suicide had a serious physical illness at the time of their deaths (Dorpat, et al, 1968; quoted in Resnik and Cantor, 1970). In another study, "more than 60 percent of the men...committed suicide because of extreme illness" (Miller, 1979, p. 26); approximately one-fourth of these cases involved terminal illnesses. Some studies are marred because they fail to distinguish the presence of a disease from knowledge of the disease and both from fear of a disease, which may or may not be present or known. And yet all of them may vary independently and may not even be correlated with the experience of illness. In retrospective studies, autopsy records permit investigators to identify actual diseases as antecedent factors but not necessarily as causal factors. Some researchers have found that approximately 75% of those who committed suicide had been under the care of a physician shortly before their act (Miller, 1979, p. 69); but such information is not helpful without other information and comparison with people of the same age who did not commit suicide.

There is evidence that people tend to commit suicide when they find their situations "unbearable" (Miller, 1979), that is, when they experience loss, which might be physical, social, etc., and past, present, or future (i.e., anticipated), and when they believe that they have no alternatives or options (Perlin, 1985). For example, in one case (Perlin, 1985), an elderly woman committed suicide after being told that she had terminal cancer, that no treatments were available, that her only relative, a sister, could not care for her, and that there was a three-week waiting list for the hospital. Many professionals now emphasize that antidepressants might be appropriate even if the news that is given to the patient-- e.g., terminal illness and no options-- would naturally lead to depression; medication may be helpful even if the depression is rational in view of the bad news and absence of options (Perlin, 1985).

There is some evidence that the institutional setting makes a difference in reported attitudes of elderly patients to survival (Perlin, 1985); for example, patients in hospitals are more likely to report that they want to live than patients in nursing homes. It is more difficult to correlate attitudes with particular life-sustaining treatments. Studies in the late 1960s and early 1970s suggested that increased suicide rates (not merely among the elderly) tended to be correlated with dialysis treatment for end-stage renal disease (Abrams, 1970); with improvements in dialysis treatment, these figures have reportedly declined. But the anticipation of a long, lingering death under the control of strangers in impersonal institutions with various tubes and machines, all generating the image of helplessness and loss of control, has led some elderly people to commit suicide, even though there are no helpful statistics to indicate the magnitude of the problem. One clear case that has been widely discussed involved the Van Dusens (See Case #10). In terms of the distinction introduced earlier, such suicides may be both instrumental and expressive. The role of religious convictions and practices in elderly suicides appears to be similar to its role other suicides: There are ascending suicide rates among Jews, Catholics, and Protestants for reasons discussed earlier (Miller, 1979).

What about assisted suicide, especially among the elderly? Miller (1979) contends that "many geriatric suicides oculd not be accomplished without the assistance of a cooperative spouse." However, because "assistance" covers so many actions and nonactions, it is even more difficult to determine its role than to determine that a suicide has been committed. In one study of spouse-assisted suicides (usually wives assisting husbands because of the larger number of elderly male suicides), Miller (1979) identified three main patterns: (1) spousal nonintervention in their husbands' impending suicides despite long advance notice because they approved the acts to end devastating illnesses (see Case #11); (2) spousal failure to take any appropriate action after discovering suicide notes (or being told by the husband) prior to the actions sometimes because they didn't believe that the notes (or oral comments) were serious; (3) delay in seeking help after act, but before the death has occurred. All of these involve omission rather than commission, nonintervention rather than intervention. They fall short of other kinds of assistance, such as providing the means of suicide, and despite anecotal evidence about other means of assistance, we lack the statistical data. We also lack statistical data about the assistance by parties other than spouses-- e.g., physicians.

In conclusion, there is a great need for additional and reliable statistical data. Not only is it probable that the incidence of suicide among the elderly is greatly underreported, but we lack helpful information about refusal of life-sustaining treatment. Regarding suicide, it would be helpful to have better studies of the various conditions, such as mental and physical illness, that may be antecedent factors and studies to determine whether they might also be causal factors. In addition, it would be helpful to have correlations with social settings for the treatment of illnesses, such as homes, hospitals, and nursing homes, and with the technologies to treat life-threatening illnesses. It is probable that in many if not most cases suicide will continue to have negative emotional and sometimes financial repercussions for survivors; any research should be designed to avoid causing harm while generating needed information. Information about the degree and kind of assistance by others would also be helpful but perhaps impossible to generate, especially in view of the threat of legal liability.

Regarding refusal of life-sustaining medical treatment, research should be designed to provide the kind of information just identified for suicide. It will be important to identify attempted as well as successful refusals (just as it is important to identify attempted as well as successful suicides). Questions are rarely raised about a patient's competence to consent to treatment if he or she accepts the treatment; but when a patient refuses a treatment that the physician believes should be accepted, then questions of competence emerge (Carlton, 1978). Hence, many attempted refusals are unsuccessful because of paternalistic and other interventions (Childress, 1982). Here again the reasons for the refusals are important and need to be identified, particularly as they relate to the nature and severity of the illness, chances of sucessful treatment, anticipated quality of life, social and institutional setting, and types of life-sustaining treatment. Now that advance directives are available for refusal of treatment in a large number of states, further research should be conducted about their use by the elderly.

Case # 9

Mr. B.'s mother died when he was 2 years old. As a result, he was raised by an uncle and was never close to his father. Although he was 64 years old when he took his life, his physical condition had deteriorated to that more commonly associated with a much older man.

Mr. B. had been a salesman and a diabetic most of his adult life. The majority of his physical problems had not become severe until five years before his death. He then began experiencing such a rapid physical decline that even ten operations could not restore his health.

Hemorrhaging caused him to become almost blind and problems with his ears caused him to become virtually deaf. A stroke left one side of his face distorted and made it difficult for him to eat or walk.

A week before he took his life he had undergone another unsuccessful ear operation. The morning before his death he said "Something has popped in my head" and after it burst he screamed to his wife of forty years: "Don't leave me! Don't leave me!" The night before his suicide he said: "They've messed me up again. I'm not going to put up with this."

On the last morning of his life Mr. B. "looked and acted very peacefully." He ate an unusually large breakfast and "seemed contented." After eating, Mr. B. called a taxicab, went to a nearby bank, withdrew some money, and returned home. He later took another taxi, apparently purchased a gun, and returned home "with a brown paper bag."

A neighbor saw Mr. B. walk to the side of his house where he normally never walked. He removed the gun from the bag and shot himself in the head. The neighbor witnessed his suicide and shouted at him to stop, but it is doubtful he heard her or would have complied with her request if he had.

Although his widow was obviously relieved that her husband no longer had to suffer, Mrs. B. was unable to say she would have rather he were out of his misery than still alive and living with her.

[Marv Miller, Suicide After Sixty: The Final Alternative (New York: Springer Publishing Co., 1979), pp. 30-31]

Case # 10

Dr. Henry Pitney Van Dusen was internationally renown as an ecumenical leader, who helped to found the World Council of Churches in 1948, and as a theological educator, who was president of Union Theological Seminary in New York City from 1945 to 1963. A person of great vitality and will, he was severely restricted during the last five years of his life because of a major stroke that limited his physical activity and hampered his speech. Mrs. Van Dusen carried the burdens of her husband's illness for five years although her arthritis seriously handicapped her. She saw that she would not be able to care for him much longer. Both of them were members of the Euthanasia Society, and they entered a suicide pact rather than face the prospect of further disability. She died the night they took an overdose of sleeping pills; he vomited up many of the pills but died fifteen days later on February 13, 1975.

[This case has been drawn from John C. Bennett, "The Van Dusens' Suicide Pact," Christianity and Crisis, Vol. 35, no. 5, March 31, 1975.]

Case # 11

When Mr. P. was 25 years old, married, with a young child and his wife pregnant again, he was told he had muscular dystrophy. He eventually developed other painful conditions, such as ulcers, hemorrhoids, and arthritis of the spine.

A very active man when he was younger, Mr. P. had become overwhelmed by his illnesses and confined to a wheelchair for the last ten years of his life. He referred to the wheelchair as "his coffin on wheels."

Mr. P. apparently had a good marriage until three years before his death, when he became increasingly paranoid. He accused his wife of seeing other men, who existed only in his imagination, and became abusive when she would deny his accusations. He would check on her whereabouts while she was working.

Realizing he was venting much of his frustration on his wife, he grew deeply depressed and voluntarily sought a psychiatrist's assistance. The doctor attested to Mr. P.'s paranoid condition. He became remorseful about his abuse of his wife and told her shortly before his suicide, "I can't keep doing this to you."

Mrs. P. worked only blocks from their home. Every morning when she left for work, her husband sat by the window and waved goodbye to her. That was his daily morning ritual, but never at lunchtime, even though his wife came home for lunch every day. However, on the day he killed himself, Mr. P. sat by the window and waved goodbye to his wife when she returned to work after lunch. As she left he said to her, "Be sure my glass is out." He was referring to the only glass his weak hands could still hold.

For years Mr. P. had collected pills for what he called his "suicide kit." Finally, at age 61, he ingested a lethal dose of drugs while his wife was at work. On the way home that evening Mrs. P. sensed her husband would be dead when she arrived. She found Mr. P. in a coma, with his suicide note nearby, and quickly summoned two of his physicians. After examining him and taking his medical history into consideration, they decided not to attempt to save his life. Mrs. P. completely agreed with the doctors' decision.

When Mr. P.'s closest friend found out about the suicide, he remarked, "I'm only sorry I didn't know he was trying to kill himself so I could have helped him to do it."

[Marv Miller, Suicide After Sixty: The Final Alternative (New York: Springer Publishing Co., 1979)]

Task # 4. Discussion of Prevailing Concepts of Assisted Death

A. Concepts of Assisted Death

The phrase "assisted death" covers numerous possibilities of action and inaction. Let us start with the cases of active killing that involve both the patient and some other party--assisted suicide and voluntary active euthanasia. These differ only by virtue of who finally acts, the patient or someone else, and the difference is thus one of degree and kind of assistance. The decision-maker is the same in both cases since we are concentrating on voluntary euthanasia along with suicide.

Assistance in the implementation of a decision for suicide could include arrangement of the location or setting, provision of information about the means of bringing about death, provision of the means themselves, withholding or withdrawing life-sustaining treatments, comforting the patient in the process of dying, etc. This range is sufficient to indicate the limited utility of the concept of assisted death; it is too broad to be helpful in debates about policies or actions. The cases identified earlier involved the provision of information and means (the Rollin case # 6, pp. 22-23), support and encouragement (the Roman case # 8, pp. 25-26), the provision of the means of ending life along with the treatment (the Barney Clark case # 7, p. 24), and nonintervention (#11, p. 54). Some of these are controversial. For example, it is not clear that the physicians who gave Barney Clark the key to turn off the power to his artificial heart would have been viewed as assisting his "suicide" if he had used it (and there are debates about whether his action would have been a "suicide"). Furthermore, cases of nonintervention, such as # 11, are particularly problematic, because it is not clear whether letting die by not intervening should count as "assisted death," or, in this context, "assisted suicide."

Some would argue that it is "allowed death," not "assisted death." However, as indicated in Task # 3, Mary Miller (1979) views several types of nonintervention as "assisted suicide" and contends that many geriatric suicides are not possible without the assistance of others. In general, omission or nonintervention should count as assistance only where there is some moral or role relationship between the parties (e.g., it would be odd to say that a passerby who did not attempt to stop someone from jumping from a bridge "assisted" in the person's suicide), but even where there is such a relationship, nonintervention should not always be construed as "assistance." Furthermore, as the above cases suggest, "assistance" may include both acceptable and unacceptable acts.

Assistance is not necessarily limited to implementation of a decision that has already been reached; it may occur at the level of decision-making itself, i.e., whether to bring about death or not. Assistance at the level of decision-making may also include both acceptable and unacceptable acts, ranging from solicitation, such as encouraging, requesting, or commanding, to manipulation, and to discussion to clarify the patient's options (Francis, 1980).

The concept of "assisted death" is not very helpful because it encompasses too many different possibilities regarding who decides and who acts, as well as how death is brought about (e.g., actively or passively) and why it is brought about (e.g., whether to benefit the one whose death is brought about or others). More precision is required on each of these points.

B. Compatibility of Assisting Death with Professional Codes and Practices

The Hippocratic Oath expressly prohibits some ways of assisting death: "I will neither give a deadly drug to anybody if asked for it, nor will I make a suggestion to this effect." However, other parts of this oath are now ignored, including the prohibition of abortion and surgery by a Hippocratic physician, and some principles embedded in the oath -- e.g., the duty to benefit the patient--and others that have been emphasized since then-- e.g., the principle of respect for persons-- could lead to a different policy in the context of major developments in the technologies to prolong life.

The Principles of Medical Ethics of the American Medical Association do not directly address these issues, which are rather addressed through interpretations and applications of the principles. For example, in 1973, after prohibiting "mercy killing" or the "intentional termination of the life of one human being by another," the AMA House of Delegates held that cessation of life-sustaining treatment is morally justified when the patient and/or the patient's immediate family, with the advice and judgment of the physician, decide to withhold or to stop the use of "extraordinary means to prolong life when there is irrefutable evidence that biological death is imminent." The Opinions of the Judicial Council of the AMA (1982) hold that the physician "should not intentionally cause death"-- a prohibition that excludes mercy killing. However, the Opinions also recognize the physician's "discretion" to resolve the conflict between the commitments to prolong life and to relieve suffering. They allow necessary medical treatment to alleviate severe pain (presumably even when it may hasten death), and they allow withholding or withdrawing life-sustaining treatment "to let a terminally ill patient die." The physician may also discontinue "all means of life support" for an irreversibly comatose terminally ill patient consistent with the maintenance of comfort and dignity.

Even though the principles in the International Council of Nurses Code for Nurses (May, 1973) and the American Nurses' Assocation Code for Nurses(1976) do not explicitly address these questions, they represent a shift away from obedience to the physician and the institution to protection of the patient's interests and rights. In practice, these principles appear to have been interpreted to authorize letting patients die under some circumstances but also to rule out mercy killing (though the evidence about mercy killing is in part based on the lack of evidence for a shift away from the traditional prohibition). However, because of their close and constant interaction with patients, nurses hear requests for active and direct euthanesia more frequently than physicians do (Brown, 1971).

Finally, the Patient's Bill of Rights of the American Hospital Association (1973) includes the patient's "right to refuse treatment to the extent permitted by law and to be informed of the medical consequences of his action."

In general, these oaths and codes require actions that are consistent with the legal system, which prohibits mercy killing and assisted suicide, but the legal system's interpretation of what is permissible also depends in part on customary practice. Unfortunately, the evidence about professional practices is largely anecdotal, and the few available studies do not offer the kind or quality of information that is needed (see Crane, 1975). Codes that codify practices often lag behind changes in the practices themselves. Nevertheless, it is accurate to say that the codes rule out some forms of "assisted death," particularly those that are illegal, while accepting some other forms that were sketched in Task # 1.

C. Laws, Policies, and Court Decisions

The act of suicide has been decriminalized, but "a suicide attempt-- regardless of a person's motive-- is a basis for active intervention by public officers and for the deprivation of liberty (through involuntary psychiatric observation and treatment)" (President's Commission, 1983, p. 37). And aiding and abetting suicide remains illegal in most states-- some treat it as a separate offense; some bring it under homicide statutes; and others make it a form of manslaughter (Francis, 1980). Often, however, there is unclarity about what counts as aiding and abetting suicide. In one famous case (People v. Roberts, 211 Mich. 187, 178 N.W. 690, 1920) a women was bedridden with advanced multiple sclerosis and asked her husband to put a cup of poison by her bed so that she could kill herself. When she took the poison and died, he was prosecuted and convicted for murder on the grounds that he had assisted a suicide (Francis, 1980; Robertson, 1983). For a period Texas did not prohibit assisting suicide, and one study has argued that there is no evidence that abuses and other bad consequences occurred (Engelhardt and Malloy, 1982).

Although "mercy killing" is illegal in every state, mercy killers are not always rosecuted, indicted, or convicted. For example, they are sometimes found not guilty by reason of temporary insanity, as in the Zygmaniak case in New Jersey (Mitchell, 1976), and their motives sometimes mitigate the punishment even though they do not legally justify the act, as in several recent cases.

In general, then, there are legal prohibitions of mercy killing and assisted suicide, though, as we have seen, there is often debate about what will count as killing in either type of case as well as what will count as assistance. Few physicians have ever been tried for "mercy killing," and up to 1983 the two who had been tried had been acquitted by juries (President's Commission, 1983, p. 35). The range of legal responses to family members involved in "mercy killings" has already been indicated. However, all of these cases are to be distinguished from cases of withholding or withdrawing treatment at the patient's request. The President's Commission (1983) noted that it had "not found any instances in which criminal or civil liability has been imposed upon health professionals or others (such as family members) for acquiescing in a patient's refusal of life-sustaining treatment." More controversial in recent years has been decision-making about *incompetent* patients, who could not or did not speak earlier for themselves in the form of advance directives. In a 1983 California case a superior court dismissed murder charges against two physicians who with the permission of the patient's spouse discontinued a respirator and intravenous feeding tubes from a brain-damaged, comatose patient [*Barber v. Superior Court of California*, 147 Cal. App. 3d 1006, 195 Cal. Rptr. 484 (1983)].

Natural death or living will acts, which are now in effect in at least thirty-six states after a flurry of legislative activity in the last few years (the first one was passed in California in 1976), permit patients to make advance directives to refuse some forms of life-sustaining treatment under some circumstances, usually in connection with terminal illnesses. These statutes distinguish the patient's refusal of life-sustaining technologies from suicide, and actions by others in accord with advance directives from aided suicide and mercy killing. They also exempt professionals who rely on these directives from civil and criminal liability for withholding or withdrawing life-sustaining technologies (Robertson, 1983). Advance directives may take one of two forms: (1) specification of standards, e.g., "I do not want to be kept alive under X circumstances," or (2) designation of decision-makers, e.g., "I designate Y to make decisions for me if I become incompetent." Although some natural death or living will acts permit (2) as well as (1), (2) is also possible under some durable power of attorney statutes (see the Society for the Right to Die, 1984, 1985).

In connection with OTA's interest in particular technologies, it is important to note that over half of the thirty-six natural death or living will acts exclude some technologies from the patient's advance directives. Most statutes focus on advance directives about life-sustaining technologies, variously defined as artificial, extraordinary, prolonging the moment of death, etc. But over half use more specific language to exclude some technologies. For example, Florida's statute indicates that life-sustaining technologies "shall not include the provision of sustenance or the administration of medication or performance of any medical procedure deemed necessary to provide comfort or to alleviate pain." This statute reflects the most common exclusions: sustenance (other statutes use the language of nourishment, nutrition and hydration, food and fluids, food and water) and procedures to provide comfort (care) and to alleviate pain. It is possible that some of the statutes exclude sustenance because of the belief that it is essential for patient comfort. Some also appear to distinguish natural from artificial means of nutrition and hydration; for example, the Tennessee statute excludes the "withholding of simple nourishment or fluids," and the Oregon statute excludes "the usual and typical provision of nutrition which in the medical judgment of the attending physician a patient can tolerate" (see Society for the Right to Die, 1984, 1985). To my knowledge, none of the other technologies being studied by OTA are excluded from the patient's advance directives by any statutes.

The series of major court cases since Quinlan in New Jersey in 1975 has extended the range of permissible decisions and actions to let patients die. For example, while the Quinlan case allowed the removal of a respirator in some circumstances, the 1985 Conroy decision, also in New Jersey, allowed the removal of a feeding tube in some circumstances (although not in the Conroy case itself). Many of these decisions involve line drawing, and some are still controversial, perhaps especially those involving artificial nutrition and hydration. Each of the technologies of interest to OTA in this project has been the subject of court decisions, often but not always involving the elderly. Since the legal decisions are being analyzed elsewhere by OTA, I will only indicate examples: courts have authorized withholding or withdrawing dialysis from an elderly patient (e.g., Spring); the respirator-- the subject of most of the decisions (e.g., Quinlan, Perlmutter, Eichner, Colyer, Leach, Bartling, Foster, and Tune); antibiotics (e.g., Severns, a case that included several technologies but not dialysis and artificial nutrition and hydration); resuscitation (e.g., Dinnerstein, and Severns); and artificial nutrition and hydration (e.g., Conroy, Barber and Neijl, and Hier, which involved surgery to insert the feeding tubes). These examples are intended only to suggest that some legal decisions support withholding or withdrawing each of the technologies in question in some circumstances; these examples cannot, however, convey some other important disputes, particularly about incompetent patients and such conditions as chronic vegetation.

Q. Influence of Institutional Setting and Social Context on Assisted Death

Dramatic changes have occurred in the institutional setting and the social context of death in the USA. Earlier in this century most deaths occurred at home, but now they occur in institutions, especially hospitals and nursing homes. In 1949, fifty percent of the deaths were in institutions; in 1958 that figure climbed to sixty-one percent, then in 1977 to over seventy percent, and now it is perhaps over eighty percent (President's Commission, 1983). In contrast to the home, the hospital or nursing home provides a more impersonal and public context for dying. In addition, deaths occur among an older population, usually from chronic conditions that were diagnosed months earlier, and the dying occurs over a longer period. Some of these characteristics of contemporary dying are evident in cases presented earlier, especially cases # 3 and # 4 (p. 14-15). Different institutional settings and social contexts influence the use of life-sustaining treatments in several ways, particularly the decision to accept or to withhold/withdraw life-sustaining technologies and the implementation of that decision.

As noted earlier, it has sometimes been argued that social support for the elderly influences the rate of suicide. It is also plausible to hold that these institutional settings of the nursing home or hospital sometimes make death appear more attractive than life to older patients. In addition, each institutional setting sets constraints on decisions and actions for death, including assisted death. Some of these institutional constraints reflect the constraints identified earlier-- for example, the society's allocation of resources for and within health care; the society's rules, including its legal rules, such as the prohibition of mercy killing and assisted suicide; and the codes of various professionals who practice within the institutions. But within these social contexts, different institutions have their own special constraints, often involving their distinctive purposes, rules, and allocations of resources. Thus, for example, a patient's desire to have a life-sustaining technology used may not be implemented because of the limited number of beds in intensive care and the institution's allocation policies. Or a hospital affliated with a religious community may reflect that community's beliefs about the use of life-sustaining technologies.

It is possible to draw some rough distinctions among institutional influences. As the President's Commission (1983) noted, "acute care hospitals have a dominant predisposition to prolonging life; nursing homes have a weaker and more variable commitment to prolonging life; and hospices are characterized by an acceptance of death." Policy-makers outside and inside these institutions should (a) be aware of these tendencies and of the implications of their policies for decisions about life and death, (b) consider these constraints in the light of the moral principles and categories discussed earlier, and (c) ensure that patients and families receive adequate information about these constraints so that they can better determine the appropriate institutional setting. Once a patient is in an institution, characterized by certain constraints, it may be difficult to make some decisions without changing settings.

Nevertheless, institutions can and should be more flexible than the above distinctions suggest. Their decisions "should be governed by the principles and practices of good decision-making," and not only by their institutional imperatives (President's Commission, 1983). Even though their development is complicated and ambiguous, such institutional mechanisms as hospital ethics committees may provide possibilities to withhold or to withdraw life-sustaining treatment in accord with a patient's wishes and interests, despite the institution's tendency to treat. Furthermore, under the impact of cost-containment measures, institutions may now be subject to external and internal pressures to undertreat, rather than overtreat. Hence, it may be necessary to develop mechanisms to ensure adequate treatment in accord with a patient's wishes and interests.

It is not possible on the basis of available studies to determine the actual influence of different parties, such as family and health care practitioners, whose own decisions and actions also occur within and may be limited by their institutional setting and social context. Both families and health care practitioners are themselves influenced by the traditions identified earlier in this report, e.g., religious traditions and professional codes. And their assistance in a patient's death, whether in the decision or in its implementation, does not follow set patterns. (See the discussion in Task # 3 of spousal assistance, at least through omission, in elderly suicides.)

Even in the absence of empirical evidence about the influence and cooperation of various parties, it is possibleto suggest ways in which the influence and assistance may be or should be limited in accord with the moral principles sketched earlier. A competent patient should have the right to make his or her own decision, in advance or at the time, not to have life-sustaining technologies. But in addition to the internal limit of the patient's incompetence to decide and act in some circumstances, there are appropriate external limits, such as the society's and the professions' prohibition of mercy killing and assisted suicide. Just allocation policies by the society and the institution also set appropriate external limits on patient and family choices. Finally, the principle of respect for persons implies that the clinician is not a mere tool or instrument of the patient's wishes; for example, natural death acts generally recognize the physician's right of conscientious refusal to assist death as the patient wishes. However, the physician's duty to refer or to transfer the patient is stronger.

Task # 5. Conclusions

A. Special Significance of the Above Issues for the Elderly

Many of the above issues have special significance for the elderly, in part because of the increasingly large numbers of elderly people, the development of technologies that can sustain life longer (e.g., before antibiotics pneumonia was viewed as "the old person's friend"), the public, institutional context of dying under the care of strangers, the frequent loss of competence by elderly patients, and the limited quality of life that often results from the technologies. Nevertheless, special caution is needed, because it may be discriminatory to treat the elderly, even the sick elderly, as a class, when there are numerous individuals with various interests and wishes that require respect and assistance. For example, it is unfair to view the elderly as a class of individuals who are unable to make their own decisions, because of the wide variations among the elderly. At any rate, many elderly people are especially vulnerable because of their dependence and limited autonomy and power.

B. Feasibility and Desirability of Guidelines

The next three questions all deal with the feasibility of guidelines, and I assume that desirability, which is broader than feasibility, should also be addressed. A major question about guidelines is whether they should be procedural (i.e., indicate who should decide and act) or substantive (i.e., indicate what may and may not be decided and done, particularly how death may be brought about). In a pluralistic society, the tendency is to resort to procedural guidelines to allocate authority for deciding and acting, and this tendency is evident in the natural death acts that give people the authority to make advance directives before they become incompetent and unable to decide. However, substantive guidelines are also important, and it is necessary, if the above arguments are correct, to maintain some limits on decisions and actions -- certainly to prohibit "mercy killing" and perhaps, but less clearly, to prohibit "assisted suicide," at least in some of its forms. Both limits are already in place in state legislation and court decisions, but, in view of the lack of uniformity and clarity, it might be useful to seek uniform legislation in these areas. The following questions address substantive limits on what may be done.

1. Guidelines to help distinguish suicide from other acts of withholding or withdrawing life-sustaining treatment. Guidelines have already emerged and are evolving in legislation (e.g., the natural death acts), in court decisions, and in practice. For example, as noted earlier, the natural death acts carefully distinguish the refusal of life-sustaining treatment under specified conditions (often in the context of terminal illness) from suicide, and withholding or withdrawing treatment from homicide. There is a question about whether federal action is needed, particularly in view of the dramatic increase in state natural death acts and in court decisions that further define the competent patient's right to refuse treatment and the proxy's right to refuse treatment for incompetent patients. Again clarity and uniformity across the nation might be desirable for all parties.

2. Guidelines to help distinguish acceptable from unacceptable acts of withholding or withdrawing life-sustaining treatment. Several distinctions developed under Task # 1 have evolved to distinguish acceptable from unacceptable acts that result in death; unfortunately, applying those distinctions does not complete the moral task and may even distort it. All of them rest on more fundamental principles and values that must be applied directly to cases. Only the distinction between killing and letting die was found to be particularly useful for public policy in the sense that it is appropriate to prohibit mercy killing (though not suicide), but the distinction may be misleading if it suggests that all cases of letting die are acceptable, for clearly they are not. One possible approach is to maintain the substantive limit of the

prohibition of euthanasia or mercy killing (and perhaps of assisted suicide) and then to pursue a procedural solution: (1) competent patients, who are informed and acting voluntarily, may refuse any life-sustaining treatments if their decisions and actions would not harm others, and (2) competent proxies may refuse any life-sustaining treatments for incompetent patients subject to review by physicians, hospital ethics committees, etc., to make sure that the decision does not violate the patient's interests. This procedural solution allows competent patients wider latitude than proxies for incompetent patients because of the dangers of conflicts of interest. Opponents of such a policy would include those who would limit competent patients' decisions to cases in which they are terminally ill, imminently dying, etc.

3. Guidelines to help professionals determine their appropriate roles in assisted deaths. Whatever guidelines are developed for professionals, it is important to allow room for conscientious objection and refusal because people draw lines at different places. For example, professionals should not be forced to participate in what they believe to be an act of suicide, as in the case of Elizabeth Bouvia. In many states the natural death acts allow physicians not to carry out the patient's advance directive but require him or her to make a good faith effort to transfer the patient to the care of someone else. That may be an appropriate compromise. The guidelines on appropriate roles could legitimately distinguish the types of assistance identified under Task # 3, excluding mercy killing and perhaps even assisted suicide, while permitting professionals to relieve pain and suffering with appropriate medication even if it hastens death and to refrain from providing life-sustaining treatments refused by competent patients and (within the limits set by the patient's best interests) refused by proxies for incompetent patients. In short, the guidelines should reflect the fundamental ethical principles identified earlier: professionals may and should act in accord with the competent patient's wishes (autonomy) and interests (beneficence/nonmaleficence/ utility), and the incompetent patient's interests, subject to the constraints of just allocation of health care resources (justice) and societal rules to prevent bad

consequences (utility/justice/ autonomy). Thus, these guidelines would directly address the questions of who decides, who acts, for what reasons (why), and how.

C. Issues That Need Additional Analysis and Research

Several empirical questions of elderly suicide and refusal of treatment as correlated with illness, social and institutional context, and particular technologies need further attention-- particularly the impact of social policies, such as social security, on perceived quality of life and options under various conditions; competence of the elderly to make decisions; possible conflicts of interests between decisionmakers and elderly patients; the use by the elderly of the mechanisms provided by natural death acts and durable power of attorney statutes for decisions about termination of treatment; the probable effects of alterations in various professional, social, and legal rules that currently structure practices of allowed and assisted death; the probable impact of cost- containment measures on the care of the elderly.

D. Priorities for Public Attention Regarding Suicide Among the Elderly in in Relation to Life-Sustaining Technologies

Problems of patient interests, wishes, and control of decisionmaking in the context of societal allocation of resources and rules to prevent abuse and other bad consequences; current and possible measures to satisfy the relevant moral principles; and the inevitability of some compromises of principles in a workable policy in a pluralistic society. Although suicide is a problem among the elderly (see Task # 4), it is not clear to what extent it is connected with the use of life-sustaining technologies, and more research is needed on this subject, as well as on decisions to refuse life-sustaining technologies that would not be counted as suicide.

E. Major Public Policy Options

Several options have been identified in the course of this report, and only a few of them will only be highlighted here.

1. Formulation of guidelines discussed under B above, with particular emphasis on the continued prohibition of mercy killing and perhaps assisted suicide, on the rights of treatment refusal by competent patients (either in advance or in the situation), on the rights and limits of treatment refusal by proxies for incompetent patients, and on the appropriate roles of professionals in such decisions and actions. Attention to both procedural and substantive standards, in light of the major ethical principles and values that are relevant to these problems, and consideration of whether further clarity and uniformity across the country are desirable and possible, particularly regarding what is ethically unacceptable even if it is not possible to indicate what is ethically preferable in these matters.

On the whole, it does not appear to be desirable to attempt to differentiate various life-sustaining technologies. One of the major criticisms of the traditional distinction between ordinary and extraordinary means of treatment (see Task # 1) is that it attached moral significance to particular technologies and practices rather than to patients' interests and wishes. However, some technologies, particularly those providing nutrition and hydration, appear to many to be essential for patient comfort and for symbolizing and expressing care. Even though several natural death acts apparently exclude them from advance directives regarding life-sustaining technologies, there is continued debate about their use. For example, several court decisions have viewed artificial nutrition and hydration as relevantly similar to other life-sustaining technologies and have held that decisions about their provision should be made in the same way. A major concern is that withdrawing or withholding nutrition and hydration, even when provided through medical means, will lead to a violation of patients' interests and rights. In response to this version of the wedge or slippery slope argument, some contend there are alternative ways to avoid these dangers. In view of the vigor of the debate, it may be premature to attempt to resolve this dispute through public policies at this time.

2. Attention to the right to health care, particularly because of the new threat of under-treatment under societal and institutional pressures for cost containment (in contrast to the earlier threat of overtreatment) and because of the studies that suggest that elderly suicides (and perhaps refusals of life-sustaining treatments) declined with the provision of increased social services as a right and that elderly suicides are often correlated with disclosure of bad news such as diagnosis of serious disease and poor prognosis in conjunction with a perception of limited options. Without attention to this part of the social context, recognition of the patient's right to die based on autonomy will be construed as indifference and perhaps even encouragement or manipulation (see Battin and Mayo, 1980) of suicide or refusal of treatment.

REFERENCES

Abdul-Rauf, M., "Contemporary Muslim Perspective," in Encyclopedia of Bioethics, W. T. Reich, ed. (New York: Free Press and Macmillan, 1978).

Abram, H. S., Moore, G. L., and Westervelt, F. B., "Suicidal Behavior in Chronic Dialysis Patients," American Journal of Psychiatry, 1971.

American Nurses Association, Code for Nurses with Interpretive Statements (Kansas City, Mo.: American Nurses Association, 1976).

Angell, M., "Respecting the Autonomy of Competent Patients," N. Eng. J. Med. 310: 1115-1116, 1984.

Angell, M., "The Quality of Mercy," N. Eng. J. Med. 306: 98-99, 1982.

Aquinas, T., Summa Theologica, Dominican trans. (Westminster, Md.: Christian Classics, 1981).

Baechler, J., Suicides, Barry Cooper trans. (New York: Basic Books, 1979).

Batchelor, I. R. C., "Suicide in Old Age," in Clues to Suicide, E. Schneidman and N. Farberow, eds. (New York: McGraw-Hill, 1957).

Battin, M. P., Ethical Issues in Suicide (Englewood Cliffs, N. J.: Prenctice-Hall, Inc., 1982).

Battin, M. P., and Mayo, D. J., eds., Suicide: The Philosophical Issues (New York: St. Martin's Press, 1980).

Beauchamp, T. L., "Suicide," in Matters of Life and Death, T. Regan, ed. (New York: Random House, 1980).

Beauchamp, T. L., and Childress, J. F., Principles of Biomedical Ethics (New York: Oxford University Press, 1979, 2nd. ed., 1983).

Beauchamp, T. L., and Perlin, S., eds., Ethical Issues in Death and Dying (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1978).

Bedell, S. E., and Delbanco, T. L., "Choices about Cardiopulmonary Resuscitation in the Hospital," N. Eng. J. Med. 310: 1089-1093, 1984.

Bedell, S. E., Delbanco, T. L., Cook, E. F., et al., "Survival After Cardiopulmonary Resuscitation in the Hospital," N. Eng. J. Med. 300: 138-140, 1979.

Behnke, J. A., and Bok, S., eds., The Dilemmas of Euthanasia (Garden City, N. Y.: Anchor Press/Doubleday, 1975).

Berdes, C., Social Services for the Aged Dying and Bereaved in International Perspective (Washington, D.C.: International Federation on Ageing, n. d.).

Boyle, J. M., Jr., "Toward Understanding the Principle of Double Effect," Ethics 90: 527-538, July, 1980.

Brooke, E. M., Suicide and Attempted Suicide (Geneva: World Health Organization, 1974).

Brown, N. K., et al., "How Do Nurses Feel About Euthanasia and Abortion?", Am. J. Nurs. 71: 1415-16, 1971.

Butler, R., and Lewis, M., Aging and Mental Health (St. Louis: Mosby, 1973).

Callahan, D., "On Feeding the Dying," Hastings Center Report 13: 22, October, 1983.

Capron, A. M., "Ironies and Tensions in Feeding the Dying," Hastings Center Report 14: 32-34, October, 1984.

Carlton, W., "In Our Professional Opinion...." The Primacy of Clinical Judgment over Moral Choice (Notre Dame, Ind.: University of Notre Dame Press, 1978).

Cassell, E., "The Nature of Suffering and the Goals of Medicine," New Eng. J. Med. 306: 639-645, 1982.

Childress, J. F., Priorities in Biomedical Ethics (Philadelphia: The Westminster Press, 1981).

Childress, J. F., "When Is It Morally Justifiable to Discontinue Food and Water?" to be published in proceedings of a conference on artificial nutrition and hydration, Joanne Lynn, ed. (Bloomington, Ind.: Indiana University Press, 1985).

Childress, J. F., Who Should Decide? Paternalism in Health Care (New York: Oxford University Press, 1982).

Crane, D., The Sanctity of Social Life: Physician Treatment of Critically Ill Patients (New York: Russell Sage Foundation, 1975).

Dorpat, T. L., Anderson, W. F., and Ripley, H. S., "The Relationship of Physical Illness to Suicide," in Suicidal Behavior: Diagnoses and Management, H. L. B. Resnik, ed. (Boston: Little, Brown and Co., 1968).

Durkheim, E., Suicide: A Study in Sociology, J. A. Spaulding and G. Simpson, trans. (Glencoe, Ill.: Free Press, 1951).

Dyck, A. J., On Human Care (New York: Abingdon, 1977).

Eisendrath, S. J., and Jonsen, A. R., "The Living Will," JAMA 249 (15): 2084-88, April 15, 1983.

Engelhardt, H. T., Jr., Bioethics (tentative title) (New York: Oxford Unversity Press, 1985, forthcoming).

Engelhardt, H. T., Jr., and Malloy, M., "Suicide and Assisting Suicide: A Critique of Legal Sanctions," Southwestern Law Journal 36 (4): 1003-37, November, 1982.

Evans, A. L., and Brody, B. A., "The Do-Not-Resuscitate Order in Teaching Hospitals," JAMA 253 (15): 2236-2239, April 19, 1985.

Fletcher, J., Humanhood: Essays in Biomedical Ethics (Buffalo, N.Y.: Prometheus Press, 1979)

Fletcher, J., "In Defense of Suicide," in Suicide and Euthanasia: The Rights of Personhood, S. E. Wallace and A. Eser, eds. (Knoxville, Tenn.: University of Tennessee Press, 1981).

Fletcher, J., Moral Responsibility (Philadelphia: The Westminster Press, 1967).

Fletcher, J., Morals and Medicine (Princeton, N.J.: Princeton University Press, 1954).

Francis, L. P., "Assisting Suicide," in Suicide: The Philosophical Issues, M. P. Battin and D. J. Mayo, eds. (New York: St. Martin's Press, 1980).

Glover, J., Causing Death and Saving Lives (New York: Penguin Books, 1977).

Grisez, G., "Suicide and Euthanasia," in Death, Dying, and Euthanasia, D. J. Horan and D. Mall, eds. (Washington, D. C.: University Publications of America, 1977).

Hauerwas, S., "Rational Suicide and Reasons for Living," in Rights and Responsibilities in Modern Medicine: The Second Volume in a Series on Ethics, Humanism, and Medicine, M. Basson, ed. (New York: Alan R. Liss, 1981).

Hauerwas, S., Truthfulness and Tragedy (Notre Dame, Ind.: University of Notre Dame Press, 1977).

Hendin, H., Suicide in America (New York: W. W. Norton & Co., 1982).

Hilfiker, D. , "Allowing the Debilitated to Die: Facing Our Ethical Choices," New Eng. J. Med. 308: 716-719, 1983.

Jakobovits, I., Jewish Medical Ethics, 2nd ed. (New York: Bloch Publishing Co., 1975).

Jakobovits, I., "Judaism," in Encyclopedia of Bioethics, W. T. Reich, ed., vol. 2 (New York: Free Press and Macmillan, 1978).

Judicial Council of the American Medical Association, Opinions (Chicago: American Medical Association, 1982, reprinted in President's Commission, 1983).

Kelly, G., "The Duty of Using Artificial Means of Preserving Life," Theological Studies 11: 203-20, June, 1950.

Kelly, G., "The Duty to Preserve Life," Theological Studies 12 , December, 1951.

Kluge, E. H. W., The Practice of Death (New Haven, CT: Yale University Press, 1975).

Kohl, M., The Morality of Killing (New York: Humanities Press, 1974).

Kohl, M., ed., Beneficent Euthanasia (Buffalo, N. Y.: Prometheus Books, 1975).

Larue, G. A., Euthanasia and Religion: A Survey of the Attitudes of the World Religions to the Right-to-Die (Los Angeles: The Hemlock Society, 1985).

Lebacqz, K., and Engelhardt, H. T., Jr., "Suicide," in *Death, Dying and Euthanasia*, D. J. Horan and D. Mall, eds. (Washington, D. C.: University Publications of America, 1977).

Lo, B., and Jonsen, A. R., "Ethical Decisions in the Care of a Patient Terminally Ill with Metastatic Cancer," *Annals of Int. Med.* 92: 107-111, 1980.

Lo, B., Saika, G., Strull, W., et al., "'Do Not Resuscitate' Decisions: A Prospective Study at Three Teaching Hospitals," *Arch. Intern. Med.* 145: 1115-1117, June, 1985.

Lo, B., and Steinbrook, R. L., "Deciding Whether to Resuscitate," *Arch. Intern. Med.* 143: 1561-1563, 1983.

Lynn, J., and Childress, J. F., "Must Patients Always Be Given Food and Water?" *Hastings Center Report* 13: 17-21, October, 1983.

McCarthy, J. J., "The Development of the Doctrine of Ordinary and Extraordinary Means of Preserving Life in Catholic Moral Theology before the Karen Quinlan Case," *Linacre Quarterly* 47: 215ff, 1980.

McCormick, R. M., "The Quality of Life, the Sanctity of Life," *Hastings Center Report* 8, February, 1978.

Maguire, D., *Death By Choice* (Garden City, N. Y.: Doubleday, 1974).

Mangan, J. T., "An Historical Analysis of the Principle of Double Effect," *Theological Studies* 10: 41-61, 1949.

Margolis, J., *Negativities: The Limits of Life* (Columbus: Charles E. Merrill, 1975).

Mayo, D. J., "Contemporary Philosophical Literature on Suicide: A Review," in *Suicide and Ethics*, M. P. Battin and R. W. Maris, eds. (New York: Human Sciences Press, 1983).

Meilaender, G., "On Removing Food and Water: Against the Stream," *Hastings Center Report* 14: 11-13, December, 1984.

Micetich, K. C., Steinecker, P. H., and Thomasma, D. C., "Are Intravenous Fluids Morally Required for a Dying Patient?" *Arch. Intern. Med.* 143: 975-980, May, 1983.

Miller, M., *Suicide After Sixty* (New York: Springer Publishing Co., 1979).

Minear, J. D. and Brush, L. R., "The Correlation of Attitudes toward Suicide with Death Anxiety, Religiosity, and Personal Closeness to Suicide," *Omega* 11, 1980.

Mitchell, P., *An Act of Love: The Killing of George Zygmaniak* (New York: Alfred Knopf, 1978).

Nakamura, H., "Buddhism," in *Encyclopedia of Bioethics*, W. T. Reich, ed. (New York: Free Press and Macmillan, 1978).

National Commission for the Protection of Human Subjects in Biomedical and Behavioral Research, *The Belmont Report: Ethical Guidelines for the Protection of Human Subjects of Research*, DHEW Publication No. (OS) 78-0012 (1978).

Perlin, S., Psychiatrist at George Washington Universsity, Washington, D.C., personal communication, June, 1985.

Perlin, S., ed., *A Handbook for the Study of Suicide* (New York: Oxford University Press, 1975).

President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Deciding to Forego Life-sustaining Treatment* (Washington, D.C.: U.S. Government Printing Office, March, 1983).

Rachels, J., "Active and Passive Euthanasia," *New Eng. J. Med.* 292: 78-80, January 9, 1975.

Rachels, J., "Barney Clark's Key," *Hastings Center Report* 13: 17-19, April, 1983.

Ramsey, P., *Ethics at the Edges of Life: Medical and Legal Intersections* (New Haven, CT: Yale University Press, 1978).

Ramsey, P., *The Patient as Person* (New Haven, CT: :Yale University Press, 1970).

Redleaf, D. L., Schmitt, S. B., and Thompson, W. C., "The California Natural Death Act: An Empirical Study of Physicians' Practices," *Stanford Law Review* 31: 913-945, May, 1979.

Resnik, H. L. P., and Cantor, J. M., "Suicide and Aging," *Journal of the American Geriatrics Society* 18: 152-158, February, 1970.

Robertson, J. A., *The Rights of the Critically Ill* (New York: Bantam Books, 1983).

Robins, E., *The Final Months: A Study of the Lives of 134 Persons Who Committed Suicide* (New York: Oxford University Press, 1981).

Rollin, B., *Last Wish* (New York: Linden/Simon and Schuster, 1985).

Roman, J., *Exit House: Choosing Suicide as an Alternative* (New York: Seaview Books, 1980).

Rosner, F., *Modern Medicine and Jewish Law* (New York: Yeshiva University Press, 1972).

The Sacred Congregation fo the Doctrine of the Faith, *Declaration on Euthanasia*, Vatican City, May 5, 1980.

Shneidman, E. S., "Introduction," in *Suicidology: Contemporary Developments,* E. S. Shneidman, ed. (New York: Grune and Stratton, 1976).

Sherman, K. G., *Suicide and the Elderly* (Denton, Texas: Center for Studies in Aging, North Texas State University, 1980).

Siegel, S., "Suicide in the Jewish View," *Conservative Judaism* 32 (2), Winter, 1979.

Siegler, M., and Weisbard, A. J., "Against the Emerging Stream: Should Fluids and Nutritional Support Be Discontinued?" *Arch. Intern. Med.* 145: 129-131, January, 1985.

Smith, D. H., and Perlin, S., "Suicide," *The Encyclopedia of Bioethics*, W. T. Reich, ed. (New York: Free Press and Macmillan, 1978).

Society for the Right to Die, *Handbook of Living Will Laws*, 1981-1984 (New York: Society for the Right to Die, 1984).

Society for the Right to Die, *The Physician and the Hopelessly Ill Patient: Legal, Medical and Ethical Guidelines* (New York: Society for the Right to Die, 1985).

Steinbock, B., ed., *Killing and Letting Die* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1980).

Stengel, E., "Definition and Classification of Suicidal Acts," in *Proceedings of the 6th Conference for Suicide Prevention, Dec. 5/8, 1972*, R. E. Litman, ed. (Ann Arbor, Mich.: Edwards Brothers, Inc., 1972).

Tonne, H., "Suicide: Is It Autoeuthanasia?" *Humanist* 39: 44-45, July/August, 1979.

Veatch, R. M., *A Theory of Medical Ethics* (New York: Basic Books, 1981).

Veatch, R. M., *Death, Dying, and the Biological Revolution* (New Haven, CT: Yale University Press, 1976).

Walton, D. N., *Ethics of Withdrawal of Life-Support Systems* (Westport, CT.: Greenwood, 1983).

Wanzer, S. H., Adelstein, S. J., Cranford, R. E., et al., "The Physician's Responsibility Toward Hopelessly Ill Patients," *N. Eng. J. Med.* 310: 955-959, 1984.

Weber, M., *Law in Economy and Society*, M. Rheinstein ed. (New York: Simon and Schuster, 1967).

Weisbard, A. J., "On the Bioethics of Jewish Law: The Case of Karen Quinlan," *Israel Law Review* 11 (3): 337-368, 1979.

Wood, D., "Suicide as Instrument and Expression," in *Suicide: The Philosophical Issues*, M. P. Battin and D. J. Mayo, eds. (New York: St. Martin's Press, 1980).

Zerwekh, J. V., "The Dehydration Question," *Nursing83*, 47-51, January, 1983.

Appendix I

U.S. TOTAL POPULATION SUICIDE RATES PER 100,000 BY FIVE-YEAR AGE GROUPS, 1933-1968*

Year	10-14	15-19	20-24	25-29	30-34	35-59	40-44	45-49	50-54	55-59	60-64	65-69	70-75	≥75	≥65	All Ages
1933	0.3	4.2	10.6	12.8	15.0	18.8	24.6	31.5	35.3	41.3	44.9	44.9	47.4	42.7	45.0	15.9
1934	0.4	4.5	10.6	13.5	15.5	17.9	22.6	27.4	32.0	35.6	38.9	39.6	42.0	38.4	40.0	14.9
1935	0.4	4.2	10.3	13.1	15.5	17.6	21.1	27.1	30.3	34.2	35.7	35.7	35.4	36.5	35.8	14.3
1936	0.5	4.3	9.6	13.0	16.0	18.1	21.9	25.7	29.8	33.8	34.3	35.6	33.0	35.8	34.8	14.3
1937	0.6	4.0	10.2	13.0	15.9	18.5	23.6	28.8	31.4	34.3	36.6	35.5	32.6	36.4	34.8	15.0
1938	0.3	4.1	9.5	13.0	16.0	18.6	24.1	28.5	33.0	36.6	38.3	35.8	32.1	34.4	34.1	15.2
1939	0.5	3.7	8.3	11.4	14.6	17.3	20.9	25.6	31.1	33.3	35.7	33.8	34.1	34.0	33.9	14.2
1940	0.4	3.5	8.9	12.2	15.0	18.1	20.7	26.1	29.5	34.0	34.9	33.1	33.4	33.3	33.2	14.4
1941	0.4	3.5	8.2	11.3	13.7	16.2	18.2	21.5	25.2	29.0	30.7	29.9	32.0	32.9	31.6	12.8
1942	0.5	3.1	7.1	9.8	13.2	14.7	17.6	20.0	22.7	28.3	28.5	26.7	29.2	31.8	29.2	10.0
1943	0.5	3.0	5.8	7.5	10.1	12.2	13.8	15.8	19.5	22.7	25.1	24.8	26.7	30.2	27.2	10.0
1944	0.4	2.7	5.3	7.2	9.4	11.9	14.3	15.8	18.9	21.5	22.0	22.0	24.3	28.8	25.0	9.5
1945	0.4	2.6	5.6	7.3	10.9	13.3	15.7	17.7	21.6	23.0	24.7	24.5	27.8	29.2	27.1	10.1
1946	0.5	2.9	7.3	8.8	11.1	14.0	16.6	18.9	23.5	24.7	27.9	24.1	28.8	28.9	27.2	11.3
1947	0.5	2.9	6.3	8.1	10.9	13.7	16.6	20.0	22.5	26.2	27.9	27.6	28.0	33.0	29.5	11.4
1948	0.4	2.8	6.6	7.8	10.3	12.8	16.4	19.6	22.7	25.7	27.2	25.3	29.5	30.0	28.2	11.2
1949	0.5	2.5	6.5	7.8	9.9	13.6	17.1	19.0	23.0	27.0	29.4	28.9	27.7	30.4	29.0	11.5
1950	0.3	2.7	6.2	8.1	10.2	13.1	15.9	19.5	23.0	25.9	28.8	29.0	29.9	30.8	29.9	11.4
1951	0.4	2.6	6.1	8.0	9.1	11.5	15.2	17.8	19.8	21.8	24.8	26.7	27.8	28.9	27.8	10.4
1952	0.3	2.8	5.6	7.9	9.0	11.3	13.5	16.7	20.0	20.9	24.3	25.0	26.5	29.1	26.8	10.0
1953	0.5	2.8	6.0	8.4	8.6	11.0	14.3	17.4	20.3	21.0	24.0	24.7	26.5	28.7	26.6	10.1
1954	0.3	2.4	6.0	8.5	9.0	10.8	14.4	17.9	20.8	22.2	25.8	24.5	26.0	26.3	25.6	10.1
1955	0.3	2.6	5.6	7.9	8.9	10.3	14.5	17.6	21.9	24.4	25.2	25.2	24.7	28.6	26.1	10.2
1956	0.4	2.3	5.9	7.6	9.4	10.6	13.8	17.2	20.1	23.4	25.1	25.4	25.1	28.1	26.2	10.0
1957	0.5	2.5	5.8	7.6	9.7	10.9	14.6	16.4	20.3	22.2	22.6	23.1	24.4	27.5	25.0	9.8
1958	0.5	3.0	7.0	9.2	10.3	12.0	15.6	18.9	22.8	23.5	24.7	24.4	26.0	28.5	26.3	10.7
1959	0.5	3.4	6.8	9.1	10.5	12.3	15.0	18.1	21.7	23.9	24.8	24.5	25.2	28.8	26.1	10.6
1960	0.5	3.6	7.1	9.0	10.9	13.2	15.2	19.1	22.6	23.6	23.8	21.4	25.0	28.9	25.1	10.6
1961	0.4	3.4	7.1	9.2	11.3	13.2	15.6	18.6	22.2	23.8	22.3	21.7	22.3	27.2	23.7	10.4
1962	0.6	3.7	8.2	9.9	12.6	13.8	16.3	19.4	22.8	24.0	23.3	21.9	22.6	28.4	24.3	10.9
1963	0.6	4.0	8.5	11.0	12.6	15.5	16.6	19.1	23.3	24.6	22.4	21.5	23.4	26.2	23.7	11.0
1964	0.5	4.0	8.5	10.7	13.1	14.6	16.5	19.5	21.7	23.5	21.7	22.1	22.1	25.0	23.0	10.8
1965	0.5	4.0	8.9	11.3	13.3	15.8	17.5	18.7	22.8	24.7	22.8	22.3	21.6	25.0	22.9	11.1
1966	0.6	4.3	9.2	11.4	13.3	14.6	16.9	19.0	21.1	23.0	22.8	21.6	21.5	24.7	22.6	10.9
1967	0.6	4.7	9.7	11.8	12.9	15.7	17.5	18.2	21.0	22.6	22.1	19.4	20.3	21.8	20.5	10.8
1968	0.6	5.1	9.8	11.4	12.8	15.2	17.1	18.6	20.7	22.1	21.4	19.6	19.6	21.4	20.2	10.7

*Source: James C. Diggory, "United States Suicide Rates, 1933-1968: An Analysis of Some Trends," Suicidology: Contemporary Developments, edited by Edwin S. Schneidman (New York, Grune and Stratton, 1976) (5, pp. 48, 49).

[Reproduced from Karen Grove Sherman, Suicide and the Elderly (Denton, Texas: Center for Studies in Aging, 1980), pp. 14-15]

Appendix II

SUICIDE RATES PER 100,000 BY FIVE-YEAR AGE GROUPS, COLOR, AND SEX: UNITED STATES, 1972*

Group	Total	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	≥85
Total Population	12.0	0.6	6.9	14.0	14.8	14.7	16.1	17.4	20.6	19.2	21.3	21.6	20.8	19.9	20.6	24.6	20.5
Male	17.5	0.7	10.9	21.2	21.2	20.5	21.0	23.3	28.2	27.8	30.2	33.1	35.3	36.7	39.6	54.2	50.0
Female	6.8	0.4	2.8	6.8	8.5	9.1	11.4	11.8	13.5	11.2	13.1	11.6	9.2	7.7	7.9	7.1	5.4
Whites	12.8	0.6	7.0	13.5	14.9	15.3	16.7	18.6	22.0	20.6	22.7	23.1	22.5	21.2	21.7	26.0	22.2
Male	18.5	0.9	11.1	20.5	21.0	20.7	21.3	24.5	29.8	29.6	32.1	35.2	38.0	39.1	42.1	58.0	54.5
Female	7.3	0.4	2.7	6.6	8.8	9.9	12.3	12.8	14.6	12.2	14.0	12.5	10.0	8.2	8.1	7.2	5.9
All Others	6.6	0.2	6.5	16.6	14.4	10.7	11.5	8.5	9.6	6.6	7.5	7.6	5.6	6.8	7.9	8.5	3.0
Male	10.3	...	9.5	26.0	23.1	18.4	18.5	13.1	14.6	11.6	11.0	12.9	10.6	13.1	12.1	13.0	7.8
Female	3.3	0.4	3.4	8.2	6.9	4.2	5.8	4.6	5.2	2.2	4.4	3.0	1.5	1.5	4.7	5.4	...

*Source: U.S. Department of Health, Education, and Welfare, Public Health Service, Health Resources Administration, National Center for Health Statistics, *Vital Statistics of the United States, 1972*, Vol. II (Washington, Government Printing Office, 1972) (10, pp. 1-24).

[Reproduced from Karen Grove Sherman, *Suicide and the Elderly* (Denton, Texas: Center for Studies in Aging, 1980), p. 23]

Appendix III

U.S. WHITE MALE SUICIDE RATES PER 100,000 BY FIVE-YEAR AGE GROUPS, 1951-1968*

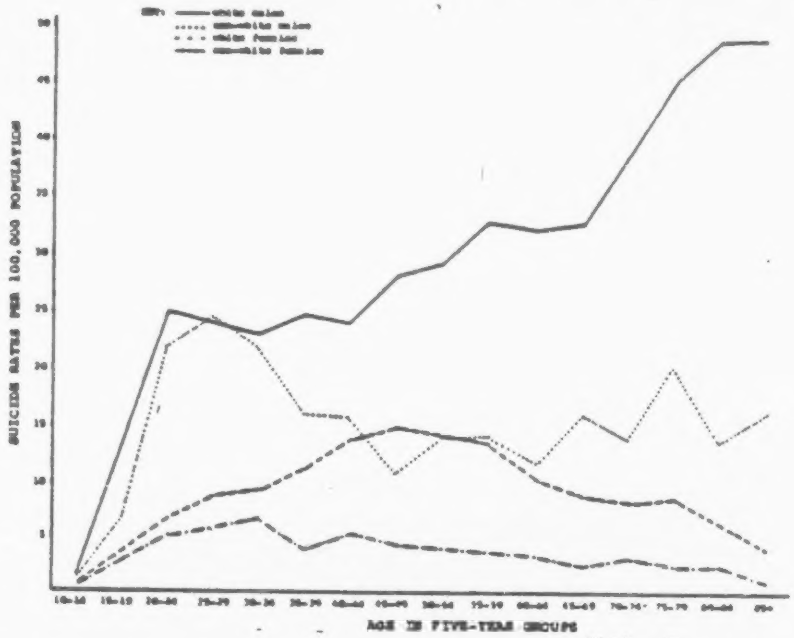
Year	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	40–74	≥75	All Ages
1951	0.7	3.8	9.7	11.9	13.7	17.5	23.8	29.0	31.8	37.0	42.8	48.2	53.4	57.4	17.3
1952	0.5	4.7	9.2	11.9	13.3	17.7	21.7	26.8	33.2	35.0	42.4	45.2	50.0	60.0	16.9
1953	0.8	4.2	9.9	12.9	13.1	17.5	23.8	28.7	33.8	35.2	42.0	45.4	50.5	58.5	17.2
1954	0.5	3.8	10.3	13.0	14.1	17.2	22.7	30.5	35.9	38.4	45.2	44.7	48.3	54.5	17.5
1955	0.4	4.0	8.7	12.5	12.8	16.3	23.5	28.0	36.1	41.7	44.0	45.0	46.3	57.7	17.2
1956	0.7	3.5	9.6	11.3	14.4	16.2	22.1	27.5	33.3	40.1	43.0	45.6	47.5	59.8	16.9
1957	0.8	4.1	9.4	10.9	14.3	16.7	23.6	26.8	34.4	37.4	38.9	41.1	46.7	59.0	16.5
1958	0.8	4.7	11.2	13.6	15.0	18.8	25.6	30.9	37.6	40.2	43.9	43.6	48.7	60.9	18.0
1959	1.0	5.4	11.0	12.8	15.9	19.3	24.0	29.8	36.2	40.7	43.1	43.2	47.4	60.7	17.7
1960	1.0	5.9	11.9	13.8	15.9	19.6	24.3	30.2	37.6	39.9	40.6	38.5	46.7	59.2	17.6
1961	0.7	5.5	11.0	13.0	16.2	20.1	24.7	29.8	36.2	40.7	38.0	38.2	42.1	57.5	17.1
1962	1.1	5.8	12.6	14.5	18.4	20.8	24.9	30.2	37.0	41.4	39.4	40.1	42.8	59.2	17.8
1963	1.0	6.3	12.9	16.2	17.7	22.2	25.0	29.4	37.0	41.4	38.7	37.8	43.4	54.7	17.8
1964	1.0	6.6	12.8	15.2	18.9	20.0	24.5	30.0	33.8	39.3	37.5	37.8	40.6	55.5	17.2
1965	1.0	6.3	13.9	16.5	18.9	21.8	25.0	26.7	35.2	40.3	38.9	37.8	41.2	53.4	17.4
1966	1.1	6.7	14.2	16.1	18.4	21.0	24.4	27.5	32.8	37.6	39.3	37.8	40.0	54.8	17.2
1967	1.0	7.5	14.9	16.9	17.5	22.2	25.4	26.8	31.8	35.7	37.4	32.2	37.9	48.1	16.8
1968	1.0	8.3	15.0	16.3	18.3	22.0	24.2	27.0	30.8	35.8	36.5	35.6	37.0	48.0	16.9

*Source: James C. Diggory, "United States Suicide Rates, 1933-1968: An Analysis of Some Trends," *Suicidology: Contemporary Developments*, edited by Edwin S. Shneidman (New York, Grune and Stratton, Inc., 1976) (3, p. 59).

[Reproduced from Karen Grove Sherman, *Suicide and the Elderly* (Denton, Texas: Center for Studies in Aging, 1980), p. 32]

Appendix IV

SUICIDE RATES IN THE US IN RELATION TO AGE AND RACE (1974)



Source: The National Center for Health Statistics

[Reproduced from Marv Miller, Suicide after Sixty: The Final Alternative (New York: Springer Publishing Co., 1979), p. 4]

Distributive Justice and the Allocation of Technological Resources to the Elderly

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DISTRIBUTIVE JUSTICE AND THE ALLOCATION OF TECHNOLOGICAL RESOURCES TO THE ELDERLY

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The use of life-sustaining technologies offers great hope for patients suffering from critical illnesses and medical crises. Many persons are alive today because of life-saving interventions such as CPR and antibiotics. Many have their lives maintained through the use of renal dialysis and prolonged mechanical ventilation well beyond the point when they would have otherwise died. Unfortunately some of these persons have their lives prolonged in significantly compromised condition. Moreover, many of the life-sustaining interventions are extremely expensive. The combination of life maintenance in seriously debilitated state and the great expense of maintaining that life have raised questions of whether it is fair or just or reasonable that scarce resources be used in this way. Furthermore, a high percentage of persons maintained though the use of life-sustaining technologies are quite elderly. Many have had long, fruitful lives. Others, even though having their lives temporarily preserved, will die after a relatively short period in spite of the intervention. Some will die because the life-sustaining technologies are only temporarily successful in arresting the terminal condition. Others are able to overcome their original medical problems, but still have relatively short life-expectancy. Statistically, they will die in a relatively short time from some other cause.

This report examines the problems if distributive justice and the allocation of technological resources to the elderly. In order tounderstand the complexity of the ethical and policy problems posed, it is first necessary to have a sense of the major competing theories of distributive justice. That will be the objective of the first part of this analysis. We shall see that each theory of distributive justice has its own implications for how health care resources are distributed to the elderly.

The second part of this report looks more narrowly at the specific question of the use of age as a criterion in the allocating of technological resources. We shall examine the question of whether it is fair and ethical to consider age as at least one of the criteria for deciding who should get a dialysis machine. We shall confront the issue of how the choice should be made between two persons of significantly different ages when there is only one ventilator or one dialysis machine available.

In the third part of this study will provide a closer examination of health care resources seeing whether the nature of the resources may have a bearing on how they are distributed. Such distinctions as high technology vs. low technology and acute vs. chronic interventions will be explored.

The later parts of this report will examine, in turn, the possible principles of macroallocation and microallocation and some public policy options.

The problems of allocating life-sustaining resources can best be introduced by considering a case problem. The case involves a patient we shall call Mrs. Bertha Wilson.

Mrs. Bertha Wilson lives by herself in a retirement condominium in Florida. Her husband, who had been a physician, died twenty years previously. She is 87 years old. She has arthritis, early signs of dementia, a cardiac arrhythmia, some problems from walking from a hip that may require surgery, and is beginning to show signs of kidney failure.

She has discussed with her physician the possibility of moving to a nursing home. She was found wandering recently several blocks from her home. She also needs close supervision for the taking of her heart medication.

She is not at all happy about going to the nursing home. In fact, she may refuse. If she does go to the nursing home, she, her physician, and ultimately the society face several difficult questions. Who will pay for that care? Should Medicare provide the coverage? If so, should it also provide the hip replacement? Should it provide the dialysis? Should her condition deteriorate, should a DNR (do not resuscitate) order be written for her in case of a cardiac arrest from her arrhythmia? Should parenteral fluids and naso-gastric feeding be provided? Assuming she desires any or all of these treatments and health professionals are available and willing to provide them, should a woman

> with all of these serious medical problems and a very short life expectancy be receiving the treatments under consideration. Should her age be a factor in making any of these decisions?

The case, which is a composite of three real-life situations, poses a set of newer bioethical problems raised by the increasing ability of medical technology to prolong life. In the 1970s the critical medical ethical issue for many people was establishing the right of terminally ill persons to refuse treatment. As that right is increasingly recognized, some patients, perhaps Mrs. Wilson, are deciding that even though their prospects are not good and their life expectancy is short, they prefer to have life-sustaining treatments. The fact that many of these persons are quite elderly and therefore have relatively short life-expectancies, introduces the role of age as a critical factor in allocating life-sustaining technologies to the elderly.

In certain countries of the world age is an important criterion in deciding who gets scarce medical resources such as dialysis machines. In Britain 80 percent of dialysis centers exclude persons over 65. In Finland 89 percent exclude those 65 and older (Prottas, Segal, and Sapolsky, 1983, p. 98). Although this may reflect a broad informal consensus rather than a formal policy (Wing, 1983, p. 1157), the pattern at the level of the individual dialysis center is clear. On the other hand, in other countries, such as Israel and the United States, dialysis center policies that exclude on the basis of age are almost unheard of (See Table I).

Table 1: Age as a Selection Basis in Dialysis Centers

Nation	Percent of Centers Excluding 55+	Percent of Centers Excluding 65+
Austria	0	41
Belgium	0	32
Denmark	11	56
Finland	66	89
France	0	6
West Germany	0	2
Greece	4	26
Ireland	33	67
Israel	0	10
Italy	1	12
Luxembourg	0	0
Netherlands	0	40
Norway	0	56
Spain	15	54
Sweden	0	42
Switzerland	0	30
United Kingdom	35	80
United States	0	0

Adapted from A.J. Wing et al., Combined Report of Regular Dialysis Transplantation in Europe, VIII, 1977, Tables VI and VIII, in B.H.B. Robinson and J.B. Hawkins, ed.s, Dialysis Transplantation Nephrology (Turnbridge Wells: Pittman Medical, 1978), cited in Prottas, Segal, and Sapolsky, 1978 p. 98).

It is more complicated than it might appear to determine exactly what accounts for these differences. While some must surely be explained on the basis of variations in feelings about whether the elderly are entitled to dialysis, other factors also come into play. Differences in levels of resources, for example, appear to play some role. Moreover, age may be being used as an indirect measure of some other variable that is considered to be a relevant basis of allocating care. It may indirectly measure likelihood of successful treatment. Decision-makers may, for example, hold that dialysis should go to those for whom it will be most successful. If authorities in various countries differed in their beliefs about whether the elderly could benefit from dialysis as much as younger persons, they would differ in their treatment of the elderly. In any case, it is clear that different patterns of allocating life-sustaining resources to the elderly exist. Different theories of distributive justice lead to different allocations not only for dialysis but for the other technologies under investigation--resuscitation, prolonged mechanical ventilation, antibiotics, and nutritional support and hydration. This analysis examines the major theories of justice and their impact on the allocation of life-sustaining technologies.

BASIC DESCRIPTION OF COMPETING THEORIES OF DISTRIBUTIVE JUSTICE

A. The Definition of Justice

The problem of how to allocate resources ethically is now normally referred to as the problem of distributive justice. Justice is a deceptively ambiguous term though. Aristotle (1962, V, 1) first distinguished between what he called the broader and narrower senses of the term justice. In the broader sense, justice means roughly the same as "the right." Thus one might say it is unjust to tell a lie. Justice in the narrower sense, according to Aristotle, refers to fair distribution. It is in this second, narrower sense that we shall examine justice in the distribution of scarce life-sustaining technologies. Our question is thus, what are the major theories of a just distribution and what are their implications for the use of age as a basis for allocating life-sustaining technologies?

B. Justice as a Principle and as a Theory of Distribution

Our project is made more complicated by the fact that even when we limit our attention to the distributive aspect, justice is often thought of as one among several fundamental ethical principles (Ross, 1939, p. 21; National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1978, Beauchamp and Childress, 1993). As a single principle it will tell us only one aspect of our moral duty--our prima facie duty to use the standard term. A prima facie duty is a duty considering only one aspect or principle of action. Since there may be many prima facie duties and they may come into conflict, an ethical theory will have to include an account of what should happen when prima facie duties conflict. The result will be what is referred to as a "duty proper."

Justice is a prima facie duty that is identified with some characteristic thought to be a proper basis of distribution such as equality, need, merit, or desert. It provides one element taken into account in deciding what is a fair distribution. It will have to be related to other basic principles (such as autonomy or beneficence) in order to determine what the proper action on balance is--our duty proper. Exactly how justice is related to the other duties will depend on one's ethical theory. The principles may be balanced--traded off against each other--or they may be ranked in some order of priority. The result is that if justice is a principle, then it is possible for an action to be just but nevertheless not the right thing to do--because other principles take precedence.

Justice may also be used as a term referring to the overall theory of how things get distributed. In this sense a theory of justice is a theory of distribution taking into account not only characteristics such as need or merit, but also how these are related to promotion of human freedom or production of benefits. It is in this last sense that we shall explore the problem of justice in relation to the distribution of life-sustaining technologies.

C. Alternative Theories of Justice

Four major answers are commonly given to the question: how are goods fairly distributed? They are, the libertarian, utilitarian, maximin, and egalitarian positions. Some theories (such as Rawls's [1958; 1971] maximin position) are meant to apply only to the basic institutions of society. Others have broader implications. Since we are primarily concerned about the basic social practices of our society, this distinction will not be critical. A number of helpful reviews of these positions have now been published (Buchanan, 1981; Beauchamp, 1982).

1. Libertarianism

Libertarianism, the first of the four theories we shall explore, is one of a group of theories that spell out what persons are entitled to possess. As such they are sometimes referred to as entitlement theories. Libertarianism, given current renewed emphasis and respectability by the 1974 publication of Robert Nozick's Anarchy, State and Utopia, holds that persons are entitled to what they possess provided they acquired it fairly. For Nozick that is by means of gift, exchange, or original appropriation of previously unowned property. Heavily influenced by John Locke and the image of original appropriation from a state of nature, Nozick's position places great emphasis on individual liberty. Persons are permitted to do whatever they want with what they possess provided they do not violate the holdings of others. It is obvious that different persons possess different amount of resources--either because they were fortunate enough to inherit them or were fortunate enough to receive natural endowments that make it possible for them to accumulate them. Holders of entitlement theories of the libertarian kind are not distressed with this result. They reject any particular "end state" or pattern as the ethically correct distribution of goods. If some possess a great deal and others do not, that is unfortunate, but not unfair--provided goods were not unjustly appropriated. Nozick and other libertarians do not oppose redistributions that make the less fortunate better off. They simply oppose governmentally forced redistributions. Those who possess may voluntarily give away what they possess as an act of charity. That would perhaps be a kind or noble thing to do, but it cannot be required of them.

2. Utilitarianism

If libertarianism takes the principle of liberty as the dominant ethical principle in determining a just distribution, utilitarianism, a second major position, takes beneficence or the maximizing of utility as dominant. Some of the most important thinkers (Bentham, 1967, Mill, 1967, Sidgwick, 1966) in the history of ethical theory have adopted this position. It is the position that what makes an action or practice right is simply that it produces the greatest good. Although some utilitarians bring other principles into account arguing that these other principles are indirectly practices or patterns that are ways of producing the greatest good, the utilitarians we are interested in at this point (the ones sometimes called act utilitarians), consider an act to be right when it produces the greatest good Applied to problems of distribution, the pattern of distribution that will be the right one is the one that produces the most good. That is the moral logic behind many policy analyses such as those using cost-benefit and cost-effectiveness analyses. They are techniques for calculating the benefits and harms of alternative policies in order to determine which one will produce the greatest good overall. Thus a straight forward cost-benefit analysis is conducted only by one who has made an implicit commitment to utilitarianism of this kind (or at least finds the question of which policy will maximize the good consequences to be relevant). By contrast a libertarian might consider it irrelevant that taking some resources from one who possesses them and redistributing them would increase the total amount of good. If persons have liberty rights of possession, then the fact that another pattern produces more benefit will not be an argument for a mandated redistribution.

3. Maximin

The libertarian and utilitarian patterns of distribution are obviously very different. They have attracted many followers. What is striking, however, is that neither necessarily involves any redistribution to meet the needs of the poor, the sick, the least well off, or the elderly (who are poor, sick, or least well off). Libertarianism would permit such redistributions as a matter of charity. Utilitarianism would be open to redistributions to the poor if, and only if, redistributing resources increased the total amount of good in the society. Such redistributions in favor of the less well off do often increase the total amount of good because the harm that is likely to be done to the wealthy person is less than the good that could be done for poorer persons with the same resources. Thus as an empirical matter, redistributions in favor of the less well off will often increase overall utility. When they do, they will be appropriate, but only because they are increasing utility, not because there is any inherent moral principle that favors equality or redistribution on the basis of need.

Others, however, do not see the drive toward greater equality as merely a strategy that normally maximizes benefit. They are concerned about those special cases where distributing things more equally or distributing in proportion to need will actually decrease the total aggregate welfare. The allocation of life-sustaining technologies is a major area where distributing resources to the least well off is not always going to maximize the good.

The most important example is John Rawls, whose A Theory of Justice (1971) has reoriented twentieth century philosophical and public policy analysis of the problems of distribution. Rawls sets out to find the fundamental principles for the basic institutions of a society. His method is a contract method, but it is important to separate the contract method from the substantive answer Rawls provides.*

Rawls (1971, p. 302) argues that two basic principles would emerge that tell us what a just distribution would be:

---

*His contract method is to attempt to determine the basic principles by asking what rational, self-interested persons would agree to if they were brought together to write the rules for the society under conditions he refers to as the "veil of ignorance". The veil of ignorance is a condition which attempts to nullify the specific contingencies of persons. Under such a hypothetical condition, persons contracting for a set of principles would not know certain kinds of particular facts: their places in society, class position or social status, their personal fortunes in the distribution of natural assets and abilities, intelligence, strength, and the like (1971, p. 137). They would also not know their individual life plans, their individual psychologies, or the particular circumstances of their society. They would know, however, the general facts of human society: political affairs, principles of

> Each person is to have an equal right to the most extensive total system of equal basic liberties compatible with a similar system of liberty for all.
>
> Social and economic inequalities are to be arranged so that they are both:
>
> (a) to the greatest benefit of the least advantaged, consistent with the just savings principle, and
>
> (b) attached to offices and positions open to all under conditions of fair equality of opportunity.

What is critical for our purposes is the following: (1) There is an initial presumption of equality of outcome in the distribution of resources. (2) Liberty stands in a special place such that equality of liberty takes precedence and cannot be overcome even to provide benefits for the least well off. (3) Inequalities are tolerated if, and only if, they redound to the benefit of the least well off.

Since the second principle of Rawls is designed to maximize the position of the minimum or least well off group, the theory of distribution articulated is often referred to as a "maximin" position. It holds that there is something morally compelling about arranging resources so that the group on the bottom is as well off as possible even if the result is that the aggregate amount of good is not as great as it could have been with some other distribution.

---

economic theory, the basis of social organization, and the laws of human psychology. The result is a hypothetical construct, a metaphor for impartiality and altruism. Rawls argues that the basic principles that persons would adopt under these conditions of the veil of ignorance are those that are required of morality. He never argues that such contracting could take place, only that if we want to know what morality requires we should try to imagine such a social contracting process and try to deduce what would result.

Rawls, like the libertarians, holds that something counts other than aggregate amount of good in a society. While for the libertarians it is the rights that accrue from personal possession, for the maximin theorist it is getting those on the bottom as well off as possible. This provides a powerful intellectual framework that overcomes some of the most severe problems with utilitarianism. Maximin theory, for example, squares with many people's moral intuition that slavery is wrong regardless of fact that it does more good that harm.

4. Egalitarianism

Maximin theory is one example of a theory of justice that places special emphasis on the needs of the least well off. It starts with a presumption of equality as a check against individual liberty and aggregate social welfare. Maximin theory has thus served as an important alternative theory to libertarian and utilitarian approaches to distributive justice. It resonates well with important religious and secular strands of Western thought. Some, however, have pointed out that maximizing the position of the least well off group does not necessarily require moving toward greater equality. In fact, maximin theory provides a framework for deciding precisely when inequalities are morally appropriate.

Several commentators (Barry, 1967; Barry, 1973; Nielsen, 1979) have thus seen fit to distinguish between Rawls and other maximin theorists, on the one hand, and "true" or "radical" egalitarians on the other. True or radical egalitarians are committed in a straight forward manner to the goal of equality per se. As Kai Nielsen (1979, p. 212) puts it, "...the income and wealth....is to be so divided that each person will have a right to an equal share."

The important test case for separating maximin theorists and egalitarians is how they handle situations where the best way to improve the lot of the least well off is to devote substantial resources to talented elites in order to give them an incentive to use their skills to benefit those on the bottom. Maximin theorists hold that in these circumstances justice requires that the resources be given to the well off elites even though inequalities will actually increase. True egalitarians are deeply distressed at the increases of inequality because they see moral importance to equality as well as increasing welfare.

Some egalitarians deal with this by saying the equality is what the principle of justice requires while other principles might permit the inequalities to exist provided certain conditions are met. For example, egalitarians might hold that those on the bottom have a claim to equality that they can waive when it is in their interest to do so. The result may appear similar to Rawls's maximin principle, but in Rawls's case it is not only right but just for the inequality to exist and those on the bottom have no special role in approving of the inequality. For the egalitarians, on the other hand, the inequality may be permitted or tolerated provided the least well off consent, but it is not just.

The maximin theorists thus provide the intellectual foundation for what is sometimes referred to as "trickle down theory." According to trickle down theory, those on the top are to be benefitted because in doing so the benefits trickle down and eventually help those on the bottom.

True egalitarians face a problem that maximin theorists avoid. One way to have full equality is to have everybody equal, but at such a low level that everyone is dead. The first suffering group that had an incurable problem would appear to command such resources that it would create a "bottomless pit." This is, therefore, sometimes referred to as the bottomless pit or "infinite demand" argument against egalitarianism.

Defenders of egalitarianism have several responses available. One is to point out that egalitarian justice itself sets some limits. If all resources were devoted to persons with incurable disease, others would actually be worse off, thus commanding a return of some of the diverted resources.

A second response is to suggest that where that group would be better off with inequality, they could surrender their justice-based claim to equality. A third possible solution to the infinite demand problem is to treat justice as a prima facie principle. Egalitarians taking this view would hold that one right-making characteristic of actions is that they produce greater equality. That characteristic of actions would then have to be combined in some way with the other prima facie principles, thus limiting the impact of the principle of justice. The "infinite" demand would cease whenever other principles outweighed the principle of egalitarian justice.

One way or another the true egalitarians do not accept the idea that justice permits or requires inequalities whenever it is in the interest of the least well off for them to exist. They see something inherently right-making about equality per se.

We are thus left with four basic alternative theories for structuring societal institutions when it comes to distributing resources. Each contains a basic assumption about the correct distribution. These four basic approaches to the problems of distributive justice provide the framework for our examination of the impact on the delivery of health care service to the elderly in general and the use of the life-sustaining technologies of this study in particular.

D. The Concept of the Safety Net

Some theorists (Fried, 1975) follow a strategy of following one theory of justice for certain levels of distribution and another theory for other levels. Some, for example, adopt the maximin or egalitarian basis for distribution in order to provide persons with a basic minimum of services needed to survive. This is variously referred to as a "decent minimum," a "fair share," or an "adequate level." When two different distributional theories are combined in this way so that everyone has an entitlement to some basic necessities and free market forces prevail above the floor of basic services, the approach is now commonly referred to as offering a "safety net" below which persons should not be allowed to fall. Determining where that floor of support is is critical in determining the extent to which the distribution is essentially egalitarian or libertarian.

E. The Impact of Theories of Justice upon the Delivery of Health Care Services to the Elderly in General

The implications of these theories of justice for delivery of health care services to the elderly are more difficult to determine than it may appear. Each theory contains within it possible grounds for supporting health care services for at least some of the elderly while it also contains reasons why the elderly might not get services.

1. Libertarians

Libertarians will allocate health care services by relying on the rights of individuals to dispose of the assets they justly possess in the way they want to dispose of them. This will favor those who possess resources: money, goods, natural resources, talent, power, or the capacity to elicit charity. In will limit access to those who do not possess these resources. H. Tristram Engelhardt (1981) provides a good example. Although he does not apply his interpretation specifically to the elderly, he makes clear that the theory's implications would apply to them as well as others in the population. Presumably those who were able to acquire substantial resources during their working years or by insurance policies (including Medicare) that would continue into years of retirement would have health care services provided if they chose them. Medicare or any other insurance could not, however, be compulsory under a libertarian approach. Those who were not able to accumulate adequate resources, who had used them for other purposes (including earlier purchases of health care), who had refused to buy insurance voluntarily, or who had been refused insurance because they were bad risks would be out of luck. It would be unfortunate, but not unfair.

Robert Sade (1971) offers a rather simple, but dramatic account of the libertarian approach to allocating professional services. Citing the classics of libertarian rights tradition including Locke, Sade (1971, p. 1289) claims that, "Medical care is neither a right nor a privilege; it is a service that is provided by doctors and others to people who wish to purchase it. It is the provision of this service that a doctor depends upon for his livelihood, and is his means of supporting his own life."

While this might sound cruel, defenders of libertarian approaches point out the advantages of their approach. Persons who were not required to spend part of their earnings for compulsory health insurance could be buying other goods, presumably goods that bring them even greater happiness than the benefits they predictably would have received if they had bought the health insurance. Moreover, anyone who wanted to, under the libertarian approach, could buy any mix of insurance he desired provided only that there was enough of a market for it for someone to sell the coverage. Even if some people buy foolishly--and libertarians tend to believe that individuals know better than anyone else how they can maximize their welfare with their resources--the principles of liberty is preserved. Individuals are treated with respect as autonomous, decision-making agents. Moreover, libertarians are prepared to put in place a system of charity that will meet the needs of the elderly who do not have the resources to meet critical health care needs. Some commentators (eg. Charles Fried [1976]) combine the libertarian approach to health care with a proviso that everyone should be entitled to a "decent minimum." The President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research (1983, p. 4) appears to favor a similar two-tier approach saying that "equitable access to health care requires that all citizens be able to secure an adequate level of care without excessive burdens." Whether such two-tier approaches have strong libertarian implications will depend upon how low the ceiling is on the "adequate level." Fried gives the impression that his "decent minimum" is quite minimal making him often sound essentially libertarian.

2. Utilitarians

The implication of utilitarianism is similarly complex. A preliminary analysis suggests that the elderly are particularly vulnerable to utilitarian considerations. Whether benefits are considered in terms of the health benefits to the elderly themselves or the social benefits of the contribution of the health care recipient to the society, investments in health care for the elderly would appear to have comparatively low payoffs.

The first applications of the "value of life" analyses in the 1960s reveal how cost-benefit analysis and other techniques rooted in utilitarian premises pose special problems for the elderly. Rice and Cooper (1967) developed the basic methodology of determining the economic value of human life for purposes of making policy judgments involving choices among alternative health care investments (as well as other uses in highway safety and insurance compensation). They determined the economic value of life by calculating the lifetime earnings of persons at various ages. By use of their figures policy analysts can estimate the contribution to the GNP of alternative health care investments.

Rice and Cooper (1967, p. 1960) calculated that the present value of (future) lifetime earnings varied by age (as well as sex and color). They peaked during the third decade of life and tapered gradually to very low values, dropping precipitously at about normal retirement age. For example, using their 1967 figures the present value of lifetime earnings of white males age 20-24 was $131,416 while those age 65--69 was $13,530. Female earnings decline more gradually since Rice and Cooper chose to monetize domestic labor, which continued for more women into retirement years. The implication, however, is clear. If future lifetime earnings is a measure of benefit, health care investments that save the lives of younger people are far more efficient in producing benefit.

Rice and Cooper are careful to point out that they are only dealing with economic considerations. They do not take into account non-monetized values. They do not consider the benefits of relief of suffering, psychological rewards for the individual or significant others, etc. They make no attempt to quantify the benefit of life per se.

In the 1980s, any sophisticated utilitarian approach to health care resource allocation will insist on taking into account a much more complete and subtle range of benefits and harms. They will at least use the direct health care measures of mortality and morbidity as the scale on which benefits and harms are measured. Even here, however, the elderly may not fare well (Avorn, 1984).

Consider a health planner who was doing a cost-benefit analysis of alternative investments of health care dollars using costs per life year of life expectancy added as the criterion. Here there is an important difference between one-time or acute health care services (those such as penicillin for pneumonia that overcome a death risk with a confined application) and services for chronic conditions--those such as blood pressure medication or insulin that produce their benefit only so long as they are being administered. At least with regard to what I have called one time or acute health care services, the elderly are at a real disadvantage when years of life expectancy added per unit of cost is used as an evaluation criterion. A one treatment application of penicillin for pneumonia in a twenty year old will add decades more of life expectancy while a similar treatment applied to an octogenarian will add only a few years of life expectancy. The cost per year of life expectancy added is many times greater for the elderly person even assuming that that person is just as easy to treat as the younger person (an assumption that is often not realistic because older persons are actually harder to treat making the benefit/cost ratio of treatment of the elderly even lower). No matter how sophisticated the calculus of benefits--whether it takes into account morbidity as well as mortality, psychological as well as physical benefits, etc.--the benefits are likely to be greater when the health care services go to younger persons.

Only by complicating the utility calculus almost beyond usefulness can we begin to even out the benefit/cost ratios. We might, for example, consider the harms that would accrue to other family members if we treated younger persons but not older ones. Families would have to watch their elderly members die untreated--potentially a devastating psychological trauma. Moreover, each of us would have to anticipate that we would one day be in the category of the elderly who would not be treated. That would count as a harm in a sophisiticated cost-benefit analysis of treatment or non-treatment of the elderly. It is conceivable that these subtle, psychological factors would provide enough harms to counterbalance the more obvious benefits of limiting health care to younger persons. Such as subtle analysis would also have to take into account the social costs of losing persons who have long years of training and experience. In all likelihood, however, on balance the elderly would not fare well with utilitarian approaches to health care resource allocation.

3. Maximin

Maximin theory poses an intriguing and virtually unexplored problem when health care services for the elderly are assessed. Are the elderly one of the groups who are least well off? If they are, according to maximin theorists, they deserve priority. If they are not, then others will get the resources. Of course, according to maximin theorists even if the elderly are a least well off group, they, themselves, might not get the resources. The resources might go to talented younger persons who can thereby be induced to use their talents for the benefit of the elderly. The basic problem, however, is whether they are a least well off group.

Many would argue that the elderly are long neglected as a vulnerable, deprived, suffering population group. They are often alone and abandoned. Sometimes they do not have adequate resources to live. They are inevitably headed for health problems. At least insofar as we are considering health care, they are a group with great need.

On the other hand, many elderly persons are quite well off. They are doing well financially. They are not troubled by psychological or physical ailments. They are perhaps better off then ever before. Moreover, all the elderly have something that those needing critical medical care at earlier ages do not have. They have the certainty that they will live to old age and enjoy the life experiences of the full life cycle.

It is critical here to distinguish between two ways of determining how well off people are. One approach--call it the slice-of-time perspective--asks how well off people are at a given moment regardless of the joys and sorrows, benefits and burdens at others points in their lives. The second approach--call it the over-a-lifetime perspective--asks how well off people have been summing the net of the benefits and burdens over their lifetimes(Veatch, forthcoming). Assuming that people who have continued to live consider life a net benefit--an assumption used widely in many legal and policy debates--older persons can be said as a group to have had more good. The eighty-year-old who is with certainty dying peacefully having completed his life projects may be better off than the twenty-year-old who has a heart condition from which it is said he had one chance in ten of dying within the year. From the over-a-lifetime perspective, the eighty-year-old is much better off. If the goal is to use a maximin strategy, the twenty year old with heart disease would get a higher priority.

Maximin strategies will depend entirely on which groups are least well off. That in turn will depend on how one determines what it means to be least well off. If the slice-of-time perspective is adopted certain elderly--the sickest--will have high priority for health care services. Since there are more sick elderly, they are likely to command tremendous resources. If, however, the over-a-lifetime perspective is used, the elderly are likely to get very low priority.

There is a puzzle left from this analysis. If the over-a-lifetime perspective is used for determined who is least well off and the elderly thereby come out as not the least well off, that seems to imply that no resources can justifiably be spent on the elderly--not even for pain relief, the basics of nursing care, and simple life-saving treatments (penicillin for pneumonia in an otherwise healthy woman), etc. Do we have to wait until the elder person is so miserable that his agony in old age wipes out the pluses of an entire lifetime in order to provide him an injection of morphine for the agony of a cancer? Surely not.

One solution may be some sort of compromise between utilitarian and maximin approaches in which the younger persons are given priority on research and development of treatment for incurable diseases of younger persons except when a treatment for the elderly produces great benefit inexpensively. This, however, requires the maximin theorist to move outside the maximin framework. Another solution that stays within that framework would be to use the over-a-lifetime perspective for determining who is well off in cases involving research and development and experimental and expensive treatments, but shifting to the slice-of-time perspective when deciding who is least well off when dealing with treatments that provide great benefit inexpensively. The theoretical basis for determining who is least well off and why is as yet undeveloped.

4. Egalitarians

Several writers (eg. Childress [1984]) and especially those working within gerontology (eg. Moody [1978]) have written with the assumption that the elderly deserve to have their health care needs met exactly the way any other persons do without using age as a criterion. Their positions will be explored more later. For now, they can be cited as examples of an egalitarian approach to health care for the elderly. The egalitarian approach is committed to meeting needs equally. It is now apparent that these egalitarians base their conclusions on the implicit use of the slice-of-time perspective for determining that persons of any age have an equal claim to have their needs met. Persons of equal need for health services are equally poorly off at the time of the need. An egalitarian would conclude that equal needs deserve equal treatment. They do not appear to consider the possibility that over-a-lifetime the elderly may be better off than persons in other age groups who have medically identical problems.

Like the maximin theorist it would appear that the egalitarian will have to determine whether to assess well being over-a-lifetime or at a moment in time. The one potential difference between egalitarians and maximin theorists when it comes to allocating health care services to the elderly will not be over which time framework to use in determining who is least well off. It will be over whether improving the well being of the least well off group (elderly or otherwise) will justify use of resources to provide significant incentives for those with talent to do the work necessary to provide the benefits. The egalitarian would want the resources to go directly to the least well of group while the maximin theorist would be content to improve the lot of the least well off by transferring the resources to talented elites increasing inequalities, if necessary.

F. Impact of Theories of Justice on the Use of Life-Sustaining Technologies with the Terminally Ill Elderly

1. The Concept of Terminal Illness

Before addressing the implications of the various theories of justice on the use of life-sustaining technologies with the terminally ill elderly, a word needs to be said about the concept of terminal illness. Since other studies being done for this project address this issue in detail, here it is only necessary to point out that terminal illness will be taken to refer to those who are on a relatively rapid trajectory of deterioration that can with reasonable certainty be predicted to lead to death in a relatively short time. This is basically the same definition as that used by the Hastings Center group writing on the morality and economic of terminal care (Bayer et al., 1983). The time period is arbitrary, but three to six months is the range used for this discussion. Even with this definition the term "terminal illness" can be used in two very different ways. It can be limited to those who are inevitably on a trajectory of deterioration that will lead to death in a relatively short time regardless of medical interventions. It can also be used, however, to refer to those who will die unless treated, for example, by a life-sustaining technology. A person who has end stage renal disease and is refusing dialysis is terminal in this second sense, although that person is not dying inevitably. In examining the impact of theories of justice on the use of life-sustaining technologies it will be necessary to keep these two meanings separate.

2. The Implications of Various Theories of Justice

a. Libertarianism. The critical question from the libertarian perspective is who would want and be able to purchase life-sustaining technologies if free market forces and charity were the only bases of access. A crucial difference would appear to be whether one has purchased insurance. Some of the technologies--such as hemodialysis--are so expensive that virtually no one would be able to afford the treatment who had not purchased insurance for it. Moreover, it is likely that the cost of the insurance with such services included would be quite high, dissuading all but a very few from even covering the costs through insurance.

More fundamental is the question of whether people would buy health insurance that included these life-sustaining technologies for the terminally ill elderly. Some people would not buy such insurance simply because they do not plan ahead. Others, however, might choose consciously to exclude these coverages. They might do so for two slightly different reasons. Some might exclude some life-sustaining technologies for the terminally ill because they would not see any value in them.

There are problems with this position, however. Most people would at least want life-sustaining technologies if they relieved pain and suffering and relieved it at relatively low cost (as hydration and nutrition might do). If possible, they would probably want coverage that provided life-sustaining technologies only as part of a comfort care regimen. Some might also desire to have more aggressive treatment, but the libertarian approach would require them to compare the benefits of having the insurance coverage with the benefits of having the money needed to buy that coverage to spend on something else. It is likely that a great many people would forego the coverage, especially coverage beyond that necessary to provide comfort. They would probably be more willing to buy coverage for life-sustaining technologies that were relatively inexpensive, but very few would likely buy unlimited coverages including, say, hemodialysis during terminal illness.

Not everyone is likely to have the same response to schemes to permit persons to buy coverage for life-sustaining technologies during terminal illness. The differences would reflect not only personal preferences, but also ability to pay. It is likely that among those who would desire life-sustaining technologies during terminal illness, the poor would have much less coverage than the wealthy. This would be true even for comfort care.

b. Utilitarianism. Utilitarianism would provide a very different analysis of the use of life-sustaining technologies during terminal illness. It would ask what the benefits are in comparison to the costs (economic and social). It would then compare the net benefits from the use of these technologies with the net benefits of other uses of the resources.

Given that some persons consider some uses of these technologies during terminal illness a net negative, the case for their use will be a difficult one to make. The calculation will have to involve benefits to the patient as well as benefits to society. In both cases the benefits are problematic. Surely in some cases the patient will benefit, either because the treatments will relieve pain and suffering or because the patient's continued living is thought to be desirable by the patient and/or others. Even in those cases, however, the benefits are likely to be small in comparison to the use of the resources in other ways.

Earlier a distinction was made between those who are inevitably dying and those who will die if they are not treated with a life-sustaining technology, but could live if treated. A distinction has also been made between life-sustaining technologies that are used on a one-time basis to meet acute needs and those that must be used chronically. Both of these variables have direct bearing on the anticipated benefit from the use of a technology. Thus, for the utilitarian, who is especially concerned about anticipated benefit, the classification of the patient (whether he or she is inevitably dying) and the treatment (whether it is used acutely or chronically) will be very important.

At least for the inevitably dying, the benefits will be short-lived. For the use of technologies that are not used chronically, such as CPR and antibiotics, the same investment of resources in someone who is not dying will produce much greater payoffs measured in years of life added. Even for those elderly who are terminal, but not inevitably terminal because the life-sustaining technology could reverse the downhill trajectory, the benefits of the use of the technology will be relatively brief in comparison with the use of the same technologies for younger patients.

On the other hand, if years of life added is the criterion of a utilitarian analysis and the life-sustaining technology in question is one that must be applied continually (such as dialysis or chronic naso-gastric feeding) then the benefit from applying this technology to the terminally ill may be as great as it would be in applying it to younger, non-terminal patients. Dialyzing one thousand terminally ill elderly patients for one week each produces the same number of life-years added as dialyzing one non-terminal forty year old for one thousand weeks. The critical issue here is whether life-years added can be taken as the end point of a utilitarian calculus or whether adjustments would be made by the utilitarian for the quality of the years lived. A good case could be made that the thousand weeks bought dialyzing the non-terminal forty year old may be of higher quality than the seven days of each of one thousand elderly dying patients. A consistent utilitarian would want to make such adjustments for quality. Policy analysts such as Richard Zeckhauser and Donald Shepard (1976) have proposed conducting cost-benefit analyses using units of quality adjusted life years (QALYs) as a way of making such adjustments. The only utilitarian argument against use of something like QALYs is that the adjustments would be too complicated and too controversial to make such that their costs exceeded their benefit.

Utilitarian analysis would also require taking into account the net benefits to society of the use of these technologies and alternative uses of the funds. Their use might be supported on grounds of social benefits in rare cases where the terminally ill elderly person could still make a substantial social contribution, but that is likely to be rare. When compared with the use of the resources in other ways, the social benefits are likely to be small.

The social benefit that a more sophisticated utilitarian is likely to identify is the benefit for family members who will get positive value out of seeing a loved one live a bit longer. In some cases these benefits could be substantial such as when a relative is traveling from out of town and desires to see the terminally ill person one last time. A thorough utilitarian would insist that these benefits be included in the calculation. These social benefits are extremely subjective and hard to quantify, however. Moreover, their inclusion has some strange implications. A terminally ill elderly person with no relatives or friends would have no claim based on these social benefits to the treatment. This could lead to unlikely policies of using life-sustaining technologies for the terminally ill only in cases where there are relatives. More unlikely, their use really ought to be reserved for those cases where relatives will be made happy by the dying one's continued living.

There is one final issue raised by a utilitarian calculation. Different life-sustaining technologies may have different subjective impacts on the population. In some cases the decision to prohibit their use is likely to be very distressing to the sense and sensibilities of some of the population. In other cases, the decision not to use the technology may produce little distress at all. For example, the level of psychological distress at the decision not to provide basic nutrition and hydration is probably much greater than that of deciding not to implant an artificial heart in a person who will inevitably die without one. In fact some persons appear to feel real distress at the artificial heart's use. They see it as "playing God," as tampering with areas best left untouched.

How should a utilitarian respond to these different subjective feelings on the part of members of the society? Should they be considered as benefits and harms of the treatment decision? It seems odd to decide whether naso-gastric tube feeding on the basis of whether makes other people uncomfortable not to provide such feeding. We normally do not think we should determine which treatments should be provided by determining whether citizens are upset by lack of its provision. A utilitarian approach to allocating life-sustaining technologies will have to determine whether these subjective benefits and harms of providing life-sustaining technologies are relevant or whether more objective measures such as years of life added or QALYs added should be used instead.

c. Maximin and Egalitarian Approaches. In contrast to the utilitarian theorists, maximin theorist and egalitarians would be much less concerned about he classification of the patient (based on whether or not he or she is inevitably dying) and the treatment (based on whether it is an acute or chronic intervention). This is because for them projection of aggregate benefit is not critical as it is for the utilitarian.

The critical question for both the maximin and egalitarian analyses is whether the terminally ill elderly are a least well off group and, if so, whether the technologies provide any benefit. The terminally ill elderly might well be considered a least well off group. From the slice-of-time perspective, they are in very bad shape. Yet from the over-a-lifetime perspective they are plausibly better off than persons who are terminal and young.

If the terminally ill elderly are viewed as a least well off group, they have claims to the resources that would benefit them according to maximin and egalitarian theories. In the case where the life-sustaining treatment is perceived as beneficial, then maximin and egalitarian theorists who conclude the terminally ill elderly are a least well off group would support treatment even if the benefits were minor.

There is room for dispute among these theorists about what should happen when the patient perceives that the treatment would be beneficial, but there is very good reason to believe that it would not be. What should happen, for example, when a dying elderly patient insists that an antibiotic be used for an infection when the consensus of medical opinion is that the antibiotic is extremely unlikely to overcome the infection and is very likely to produce undesirable side effects. Withholding the antibiotic is likely to produce distress for the patient, but supplying it is likely to produce harmful side effects. Maximin and egalitarian analysts will need to decide whether their theories require providing subjective benefit from the patient's perspective or only benefits measured in some more objective manner.

If the terminally ill elderly are viewed as a group that is not least well off, a different set of issues arise. Presumably maximin theorists and egalitarians would reach the conclusion that the life-sustaining technologies should be withheld on grounds of justice. Consider a dialysis patient who has a few days to live and those days will be lived in a state of semi-conscious stupor. It may be tragic to have to withhold dialysis or CPR from such patients on resource allocation grounds, but if, by hypothesis, others are in greater need, then that is the decision a maximin theorist or egalitarian would support. They might for example, favor a new DRG for the irreversibly vegetative patient and advocate assigning a very low reimbursement weighting to it.

For life-sustaining technologies that also provide comfort and do so relatively inexpensively the problem is more complex if the terminally ill elderly are not a least well off group. Consider a terminally ill elderly patient whose life will be sustained through hydration and naso-gastric tube feeding. What should happen if withdrawing those treatments produces discomfort for the patient. The logic of the egalitarian or maximin analysis is that, if these are not least well off patients, it might be argued that they have no claim to the resource even if the suffering prevented is quite great and the cost of the treatment is quite small. For a terminally ill elderly person who has previously had a good life, the burden would probably have to be severe in order to outweigh the lifetime of well being. Even more absurd, for another terminally ill elderly patient who needs food and fluids for comfort, but who has had a miserable existence throughout his life, his claim for benefit would be much greater. It is for these reasons that some egalitarians are arguing that for providing the basics of comfort care, the slice-of-time perspective must be used even if for more complex decisions pertaining to research, development, and experimental and high technology treatment the over-a-lifetime perspective is appropriate.

G. The Interface between the Ethics and Economics of Distributive Justice

From what has been said thus far, it should be clear that the ethical issues raised by the use of life-sustaining technologies for the elderly are closely related to the economics of their use. In fact much of the discussion has drawn upon writings in the field of economics and policy science. Economics, however, can only tell us certain things about the use of life-sustaining technologies for the elderly. It can give us data about the dollar costs per unit of benefit. It can, by extension, give us data about the others costs as well, the social, psychological, and cultural costs. What it cannot do is tell us how those data ought to be assessed.

Each of the theories of distributive justice has a set of ethical presuppositions underlying it. One emphasizes liberty and the rights that accrue with ownership of private property; another emphasizes the goal of maximizing aggregate net benefit, maximizing the position of the least well off groups, or striving for greater equality. Thus even if we had complete agreement on the relative costs and benefits of alternative policy options, we would not necessarily know which policy to adopt.

Economists and policy analysts have become very proficient at generating and processing data for complex policy issues of the kind being addressed here. However, from within their own discipline they cannot determine which kinds of analysis are going to be decisive for deciding about the allocation of life-sustaining technologies. For example, different computer programs would have to be written for policy analysis depending on which theory of justice was adopted. A traditional cost-benefit analysis would require a computer program designed to calculate the ratio of aggregate benefits to aggregate harms of alternative policy options. A utilitarian would be very interested in that result. But a maximin theorist would not. He or she would be much more interested in a more differentiated analysis in which net benefits were calculated separately for each group with particular interest being given to the figures for the least well off group. Egalitarians on the other hand would program their computers to calculate the standard deviation of the individual net benefits for persons effected by alternative policies. The egalitarian would opt for the policy that has the smallest standard deviation of benefits. Finally, the libertarian would not be terribly interested at all in the economic and other data except insofar as it helped individuals make better choices about how to buy health care and invest in insurance.

It is possible that some policy decisions could be made drawing on the ethics of terminal and critical care without looking at economics at all. Under most systems, persons ought to be permitted to refuse care that they do not find beneficial provided that the refusal does not generate extra costs for society (and normally it would not). Probably only the utilitarian theory could easily justify forcing care in such a case and then only when the benefits to others of keeping the patient alive outweighed the harms to the patient.

Increasingly, however, the critical ethical problems in health care will be distributive justice problems. The life-sustaining technologies that are the focus of this study are often technologies that, from the patient's own assessment offer marginal benefit, but at great costs to third parties (insurers, hospitals, and governments). In that case the cost of care becomes a critical ethical problem. Only by choosing a theory of distributive justice and integrating that theory into the calculations and analyses done to compare policy alternatives will we be able to decide how to respond to these cases where care is marginally beneficial and very expensive, but those costs are borne by third parties.

H. Summary of Implications for Life-sustaining Technologies.

It appears that whether one adopts libertarian, utilitarian, maximin, or egalitarian perspectives there are reasons for and against the use of life-sustaining technologies that are the focus of this study. The libertarian will favor the use of those technologies that can be purchased by the wealthy and those that other persons would buy primarily though an advance decision to buy insurance. These are likely to be only those uses that provide comfort care. Different persons with different economic means will buy different levels of insurance coverage. For some who have limited means, even comfort care life-sustaining technologies are likely to be foregone.

For utilitarians, any life-extending technology for the terminally ill elderly is likely to have low pay-off in comparison to the uses of the resources for other purposes. The benefits to the patient will be non-existent or low, especially for those who are inevitably dying. The benefits to society are also likely to be low. In rare cases where the dying could still provide significant benefit to society, life-sustaining technologies will be justified. In other cases, the societal benefits are likely to be quite subjective. Families may benefit from prolonging the life of the elderly person, but it is debatable whether utilitarian analysis should include subjective benefits of that sort.

Maximin theorists and egalitarians will have to determine whether the terminally ill elderly are a least well off group. If they are, then life-sustaining technologies will be used whenever they produce benefit. Whether the benefit is measured by patient preference or by more objective criteria will have to be determined. If the terminally ill elderly are not a least well off group, then it will be harder to justify the use of life-sustaining technologies. At least hydration and nutrition might be justified in those cases where they provide comfort provided the slice-of-time perspective is adopted for determining who is least well off.

CONSIDERATION OF AGE AS A CRITERION IN THE ALLOCATION OF TECHNOLOGICAL RESOURCES

A. Age as a Direct and Indirect Measure

If age is to be used as a criterion for allocating technological resources, it is important to distinguish between two different ways that age can function. Age can be the criterion in a direct way. In such cases it would be believed that age per se, independent of any of the usual correlates of age, is the legitimate basis for allocating care.

More common and probably more plausible is the use of age as an indirect measure of some other variable that is thought to be the legitimate basis for allocating care. Age can be an indirect measure of many different variables. The most obvious has been the use of age as a predictor of medical benefit. It has been common to use age as a basis for excluding patients for such procedures as heart transplants. Very old or very young patients were believed to be poor medical risks. People have believed the procedure is not likely to be successful with patients of a certain age. It is not that the very young or the very old were intrinsically unworthy. Rather the principle is that patients should not get the procedure if it will not work on them, and age has been thought to predict whether it will work. Exclusion from dialysis on the basis of age has sometimes been grounded in a belief that dialysis would not work well for older patients. These, of course, are empirical arguments resting on evidence about whether age really correlates with expected outcome. There is increasing doubt that young or old age necessarily predicts poor outcome from heart transplants. To the extent that age is being used only as an indirect measure of expected outcome, its use as an allocation criterion will depend on the empirical evidence.

The reasoning here is sometimes utilitarian in character. The goal is to use resources efficiently. If machines and skilled professionals are scarce, they should not be used in cases where the medical benefit is low. The concept of medical benefit is more ambiguous than it may appear, however. The medical benefit criterion for selection is attractive because it appears objective. It seems that if two people are candidates for a transplant and one will live more years than the other, then the one who will live longer is the correct choice. That may well be the case, but if it is, it is not without evaluative judgment. Consider the following hypothetical case.

Suppose there are two candidates for a transplant and only one organ is available. Suppose further that it is predicted that each will live ten years with the transplanted organ and that they are in all respects equal except that one patient is twenty years old and the other is eighty. They both have predicted benefits of ten years, but do they both have the same amount of benefit. If one says they do, one is assuming that life from twenty to thirty is a benefit equal to that of life from eighty to ninety. They may in fact be equal, but it is not an objective fact that they are. Someone might argue that age is to be revered and that the ninth decade is much more important to respect than the third. Or, more likely in the current youth-oriented culture, one may argue that the third decade is much more creative, exciting, productive, etc. and therefore more important. It takes a certain leap of imagination to equate years of life added to benefit.

The notion of medical benefit often includes not only years of survival but the likelihood of complications, the amount of effort necessary to make the procedure successful, the likelihood of success, and many other factors. The complex combination of these that leads to the conclusion that one patient can benefit more than another is highly subjective.

Age is an indirect measure not only of medical benefit, but a number of other factors that are significant in various theories of justice. The most obvious is that age is an indirect predictor of years of life added by a life-sustaining intervention. This is true especially for the one-time acute interventions such as antibiotics. Other things being equal the seventy-year-old can be expected to get more years of life from an antibiotic for pneumonia than an eighty-year-old. If one's policy was to allocate to the person who would get the most life years from the treatment, then age would be an important factor in deciding who gets the treatment.

Closely related, age is also an indirect measure of the amount of well-being one has had over a life time. For those who work with an over-a-lifetime concept of equality, other things being equal age is an important predictor of how much well-being has been accumulated.

The problem, of course, is that other things are not always equal. Age is a predictor of medical success, years of life added, or cumulated well being, but it is an imperfect predictor. So even if one accepts the underlying variable as a legitimate basis for allocating technologies, it does not follow that age can be used as a basis for allocating.

B. Arguments in Support of the Use of Age as a Criterion

At least four arguments appear in the literature in defense of the use of age as a criterion in allocating resources. They can be explored in turn.

1. The Age-Demands-Respect Argument

It is striking that in traditional societies age was without question as legitimate basis for allocating certain resources. The elderly commanded a special place as the ones demanding respect. In certain ways there are vestiges in our society. Older persons are still occasionally given courtesies of title. They still sometimes expect higher salaries for work similar to that of a younger person. Perhaps in part it reflected the conviction that age brought wisdom. I once referred to this view as the "older-is-better" position(Veatch, 1979). In the era of orientation to youth, it is important to realize that if age is used as a criterion for allocation, it does not necessarily mean that the elderly will be less likely to receive life-sustaining technologies. In particular, if there were a choice between person in the age group now referred to as the "young-old," say someone about sixty-five, and a newborn infant, some people might opt for the elderly person on the grounds that a person whose character is fully developed demands respect over the unformed infant.

2. Age as a Predictor of Utility

A second argument for the use of age as a criterion is more likely to lead to decisions limiting access to life-sustaining technologies on the basis of age. This second argument sees age as a predictor of the benefit that will accrue from intervention. The benefit includes the medical factors considered above, but also, especially for one-time interventions, the years of life added, the useful contribution of the individual to the society in the future, etc. This argument, of course, is grounded in the utilitarian theory of justice and appeals only to those who are open to utilitarian reasoning as at least a partial account of what makes policies right.

Utilitarians might offer a defense of the use of age even if it is only an imperfect predictor of utility. The utilitarian, driven to maximize the net benefit, would concede that it would be best to use life-sustaining resources in the way that maximizes the benefit. They would concede that occasionally older people get great benefit out of life-sustaining technologies, that they might continue to live and contribute a great deal if they were used. They also concede that some younger people ought to be disqualified if usefulness to the patient and to society were the criterion. They might argue, however, that there would be great disutility in setting up complex procedures for determining which elderly persons of a particular age were the exceptions that justified special consideration. The labor and psychological stresses involved might make it such that the most efficient way to maximize utility was simply to include or exclude all persons of a particular age ignoring the fact that occasionally persons would thereby be wrongly classified.

> Consider Mrs. B, a woman who is eighty-five, who has diabetes, a malfunctioning hip, some signs of senility and coronary artery disease who desires by-pass surgery with the hope that it may extent her life slightly and may make her more comfortable even if it does not extend her life. Assuming a surgeon is willing to perform the operation, should Medicare policy permit the surgery with Medicare reimbursement? Surely it would for a fifty-five year old similarly situated, even if the fifty-five-year-old had psychiatric problems comparable to this patient's senility. One reason why Medicare might oppose the reimbursement is that the expected benefits--in amount and duration--are quite small in comparison to the costs.

3. The Argument for Over-a-Lifetime Well-Being

A third argument for the use of age as a criterion leads to a similar conclusion, but on very different grounds. Instead of accepting utilitarian premises it works from the maximin or egalitarian theory of justice making use of the "over-a-lifetime" perspective for determining who is least well off. From that perspective Mrs. B. might well be quite well off. At least we have no basis for assuming she is among the worst off. She is currently suffering some problems, but from what we can tell, she has had very many good years. The egalitarian who is working from the over-a-lifetime perspective would have to face the problem of whether he can presume that Mrs. B. has really done well in her earlier years and whether she would be more entitled to the bypass surgery if she had been miserable most of her life.

The most obvious response is similar to the one given above. It is reasonable to assume that life in general has been a plus. Afterall, Mrs. B. is still alive. The presumption of positive value on life is the only presumption we can make. Moreover, attempting to assess individual variations in lifetime well-being for two persons of similar age would be a overwhelmingly complicated task. For policy purposes, so the defenders of this argument would claim, it is better to have a crude, simple basis for decision that will provide at least an approximation of cumulated well-being. If this position is adopted, the older a person is, the less claim he or she has to resources. Diseases of infancy would appear to get very high priority, then diseases of children, etc. Those who have lived to old age would perhaps have a claim to the basics of care--safe, simple, treatments of basic problems, comfort care, and standard medicine, but not expensive, high technology, and experimental treatments. Instead of delivering these complex, expensive treatments to the elderly, more work should be done for those who otherwise will never have the opportunity to see old age. That is the basic position of those who offer this argument.

4. The Argument from Contract

Normal Daniels (1982; 1983) offers a final argument that may lead to the conclusion that age can legitimately be a criterion for allocating health care. It draws on certain egalitarian premises, but also incorporates many of the ideas of those committed to individual liberty. Daniels is struggling with the problem of what constitutes a fair transfer of resources for health care from the younger generation who have the ability to pay for care to the older generation who have great need for care. He suggests that we think of the problem as more an intrapersonal problem rather than an interpersonal one. Then the problem becomes one of how much of the resources available to the younger generation would prudently be saved for health care in old age.

He argues that rational persons would allocate funds in a manner that does not necessarily provide the same health care services at all ages during their lives. The population has normal opportunity ranges that vary from one age to another. What is normal functioning for one age is not for another. Daniels argues that prudence dictates that persons would allot their health care dollars with an eye to those "age relativized opportunity ranges."(p. 531) The result would be different patterns of health care for different age groups, but comparable levels of satisfaction of the age relativized opportunity range at the different ages. "Justice requires that we allocate health care in a manner that assures individuals a fair chance at enjoying the normal opportunity range, and prudence suggests that it is equally important to protect individual opportunity range for each stage of life" (p. 536).

In order to get to this conclusion, Daniels must supplement his model of the prudent saver with a concept of justice so that each person has a fair portion of health care over a lifetime (even though it may vary throughout his or her lifetime). He opts for a strategy heavily influenced by John Rawls. It is a hypothetical contract model in which persons from behind Rawls's veil of ignorance apportion their health care prudently. The result is protecting the "normal opportunity range at each stage of their lives" (p. 529), but using such judgments as a basis for generating a health care plan that would determine everyone's entitlement to care. This would mean that all persons at a given age would be treated similarly even though persons at different ages would be treated differently. Daniels has provided the framework for an egalitarian basis for using age as a criterion for allocating care. People of different ages would be entitled to care geared to different opportunity ranges, but all persons of a given age would have similar entitlement. Once again over-a-lifetime persons would be treated equally, but age would still be a legitimate criterion for allocation.

The over-a-lifetime perspective seems to imply that the younger a person is, the greater the claim to societal resources. As a practical policy matter that could create some serious problems--say of choosing between a thirty-three-year-old and a thirty-four-year-old on the basis of age. Since the primary area of controversy is over the use of expensive, marginally beneficial resources for those who have completed their life plans, it is possible that some cut off point would be adopted in using age as a criterion. Here use might be made of the increasingly important distinction between the young-old (say, ages 65-75),the old-old (ages 75-85), and the very old (ages over 85). It is possible that an age criterion could be used for allocating certain life-sustaining technologies only for the older subgroups. It is also possible that if age criteria are generally adopted, different sets would be adopted for different subgroups of the elderly. Daniels could explain this by arguing that there are different age-relativized normal activity ranges for the different subgroups.

B. Arguments Against the Use of Age as a Criterion

The arguments favoring the use of age as a criterion are clearly dependent upon the theory of justice one adopts. The argument that using age as an exclusion criterion tends to maximize utility depends on utilitarian premises. The argument that higher age implies lower priority because people deserve equal well-being and over-a-lifetime elderly persons have had greater well being depends on one version of the maximin and egalitarian positions. The hypothetical contract model that Daniels believes leads to the conclusion that people should have equal opportunity to fulfill their age-relativized opportunity ranges also stands in the egalitarian tradition.

The counterarguments will also follow the patterns established in the theories of justice debate. Any argument against the premises of the particular theory of justice will turn out to be a reason to oppose the use of age as a criterion. For example, anyone who rejects utilitarianism will likewise reject the utilitarian reasons why age might be used as a criterion. Moving to specifics, five main arguments against the use of age as a criterion seem to emerge.

1. Egalitarianism with the Slice-of-time Perspective

Perhaps the most common argument in the literature on either side of the debate over the use of age as a criterion in allocating resources is the argument that people should be treated equally and that that means equal needs should have an equal chance of being met regardless of age. Childress (1984), Moody (1978), and Siegler (1984) all make use of it. Childress and Moody appear to reflect the broad Judeo-Christian egalitarianism. They combine it, however, with the slice-of-time perspective for determining how it is that people should be treated equally. People equally sick at a given point in time have an equal claim, so the argument seems to be.

To my knowledge none of the egalitarian critics of the use of age as a criterion has dealt explicitly with either the over-a-lifetime version of egalitarianism or Daniels hypothetical contract prudent saver model, both of which treat people equally over a lifetime, but also permit, in fact require, that people of different ages be treated differently. The possibility that there can be egalitarian as well as utilitarian grounds for using age as a criterion has really not been confronted by the egalitarian critics.

2. Libertarianism

A second argument against the use of age as a criterion for allocating life-sustaining technologies is quite different. Rooted in the libertarian theory of distribution, it emphasizes that life-sustaining technologies, like other goods and services, should be available to those who want to purchase them or to those who are the recipients of gift or exchange from others who control these services. Under this view anyone who has the resources (either direct funds or insurance coverage) should have access regardless of age. Age might enter into individual choices about whether to make use of life-sustaining technologies. Some elderly people might reason that they would rather that their resources be used for other purposes. Age might also influence the distribution of resources thereby determining who has the funds to purchase life-sustaining technologies. But age per se would not, according to the libertarian perspective, determine who should have access to any resource including life-sustaining technologies. If some people are unable to gain access because of lack of resources that is unfortunate, but not unfair.

3. The Rule Utility Argument Against Using Age as a Criterion

Utilitarians will approach the problem of the use of age as a criterion in a very different manner. We have already seen that some utilitarians might argue that using age cutoffs for care is a good way to maximize the aggregate good done by a health care policy. They would argue that since age is an indirect indicator of other factors that correlate highly with the amount of benefit produced by life-sustaining technologies--factors such as predicted medical success, years of life added, and social usefulness of the life saved--it is most efficient to operate under some general rules that allocate dialysis and other technologies strictly on the basis of age.

Other utilitarians might push this reasoning one step further. They might be concerned about the disutilities of having some persons in the society receive life-sustaining technologies while others--equally sick and equally at risk--do not. They might fear the psychological stresses and social unrest created by such a policy. They might go so far as to argue that in order to minimize the social friction created by age cutoffs, everyone, regardless of age, should have the same access to life-sustaining technologies. That rule, even with the inefficiencies that result from delivering care to elderly who are likely to gain very little benefit and add very little to society, may end up producing more good than trying to institutionalize an age-based discrimination.

The utilitarians may have an additional case against the use of age as a criterion for allocating life-sustaining technologies. If age is an indirect measure of future life-expectancy or future usefulness, it is at best an indirect measure. Two people of equal chronological age may have very different physiological ages, different life expectancies, and different future productiveness. There might, therefore, be a sense of unfairness resulting from the use of chronological age as criterion resulting in discontent and further disutility.

This raises the question of whether developing indices of physiological aging would have an impact on the decision to use age as a criterion. If an index of physiological aging were developed that accurately predicted future life expectancy or future productiveness, then these utilitarian objections to the use of age as a criterion would disappear. An index of physiological age would be preferred by utilitarians to chronological age.

By contrast the development of an index of physiological age would probably have no significance for over-a-lifetime egalitarians and maximin theorists. They are interested in age, not as a marker of future life, but as an indicator of cumulated lifetime well-being. Chronological age would probably be a more appropriate measure than physiological age from this point of view.

4. The Life-is-sacred Argument

Still another argument against the use of age as a criterion is specific to life-sustaining technologies. Some people in some religious and cultural traditions--some Orthodox Jews, for example (Bleich, 1979)--believe that life is sacred. They hold that life should be never be shortened by the withdrawal or withholding of medical technologies under any circumstances. They consistently oppose withholding of respirators, the writing of DNR (do not resuscitate) orders, and the refusal of any other life-sustaining treatments. It goes without saying they oppose withholding of hydration, nutrition, and antibiotics. Anyone taking this position would necessarily oppose the use of age as a criterion for determining who should get life-sustaining technologies. These persons could consistently support the use of age as a criterion for other resource allocation decisions--those that are not matters of life and death--but they will oppose age as a criterion for life-sustaining technology allocation. They will do so for reasons that are not intrinsic to the age criterion problem.

5. The Use-of-Sociological Categories Argument

A final argument against the use of age as a criterion draws on earlier parallel debates from the civil rights and women's rights movements. In the early phases of those debates some who would defend discrimination on the basis of age or sex did so using the argument that sociological categories (such as race or sex) can be used to predict performance or success in the work place and other settings. A former dean of Harvard Law School defended the exclusion of women for the school on the grounds that there was good evidence that, on average, a woman trained in law spent fewer years working in her profession than her male counterparts. Similar arguments were offered that race was a predictor of performance. Unless there was some way of differentiating which women or blacks would under-perform, some argued that they were justified in discriminating on the basis of accurate empirical generalizations using sociological categories.

This generated substantial argument. Members of minority groups, especially those who had reason to believe they would not follow the patterns attributed to them on the basis of sociological categories, took strong exception. They argued that it was unfair to assume that they, as individuals, would perform poorly, that they would follow the sociological patterns. They further argued that sex or race is an ascribed category over which they had no control. Ascribed categories, they maintained, could not fairly be used as a basis for allocating social goods such as jobs, scholarships, or places in school. They should be evaluated as individuals independent of the ascribed categories and the performance of others in those categories.

The critics of the use of ascribed sociological categories have now largely won the debate regarding sex and race. Only in very special circumstances where sex or race in inherently linked to a job, may these factors be used as selection criteria.

The implications for the use of age as a selection criterion should be apparent. Age, we have indicated, is almost always used as an indirect, imperfect indicator for some other factor thought to be relevant in selection. It predicts likelihood of medical success, years of life added, future benefit to society, or net well being accumulated over a lifetime, but it predicts each of these imperfectly. Furthermore, age is an ascribed category. There is nothing anyone can do by hard work to change it anymore than one can (with very special exceptions) change race or sex. If race and sex cannot be used for allocation without being unfair, does it not follow, so these critics argue, that age likewise cannot be used. This leads to the conclusion that anyone who wants to exclude on the basis of medical benefit, utility calculations, or accumulated well-being over a lifetime would need to mount direct evidence that these factors justify exclusion in the particular patient. Age per se could not be used as a sociological short cut to these factors.

C. Mixed Arguments Regarding Age as a Criterion

It is possible to accept the use of age as a criterion in certain circumstances and reject it in others. We have already seen that a similar policy has emerged regarding the use of sex and race as selection criteria. Only in those cases when the sociological category was inherently linked to the position could that category be used in selection.

It is hard to conceive of situations where age per se is directly relevant to the medical consequences of life-sustaining technologies at least regarding the elderly. There may be situations in neonatology where a treatment must be delivered before the infant is a certain age or it is certain to fail. Age is more normally, however, an indirect indicator of some other variable.

We have seen, however, that some egalitarians (see Veatch, forthcoming) are experimenting with a differentiated approach whereby age is legitimately used in allocating research and development funds, experimental treatments, expensive treatments, and those with low likelihood of success while everyone would have equal access on the basis of need to inexpensive, safe, and effective treatments and to comfort care regardless of age. Daniels prudent saver, contractual scheme could easily lead to the same result. Prudent planners of a life-time of expenditures would reasonably buy insurance for inexpensive, safe, and effective treatments and comfort care regardless of age, but, whe considering their old age, they well might forego insurance for experimental or expensive treatments and those with a low probability of success. Other formulas for mixed policies where age is sometimes used as a criterion and other times is not are likely to emerge in the future.

D. Saving Lives Versus Saving Life-Years

We have seen that, especially with consequence-oriented (utilitarian) theories of justice, it will make a great deal of difference exactly what the goals of a health policy are. In particular it will make a difference in many cases to the elderly whether the goal of a policy is to save lives or add expected life-years. This difference is particularly critical for those technologies that overcome a life-threatening situation with a single set of applications. Antibiotics and CPR are examples of such technologies within the framework of this study. Other technologies that are one-time rather than continuous are organ transplants, burn treatment, bypass surgery, and the treatment of acute toxic reactions. These contrast with treatments that need to be applied continually such as chronic naso-gastric feeding, chronic hydration, dialysis, as well as insulin therapy, blood pressure regulation, and treatment of hypothyroidism.

For the acute, one-time interventions that overcome a life-threatening situation the benefit is the same regardless of age, if one takes saving lives as the goal (ignoring the differences in success rates that may be related to age). If, however, the goal is adding expects life-years, then the benefit is inversely proportion to age. The second goal is much more contrary to the interests of the elderly.

E. Intergenerational Responsibilities and Conflicts

Considering the use of age as a criterion for allocating life-sustaining technologies poses the problem of intergenerational responsibility and conflict among the generations. Thinking of the use of life-sustaining technologies for the terminally ill elderly, many individuals have come to the conclusion that such uses, even if they are desired, consume large amounts of personal resources that could better be used by one's children and grand children. On that basis some individuals forego the use of life-sustaining technologies during terminal illness.

If individuals make such decisions with their own resources, the question arises whether at the societal level policies can be adopted that preserve the society's resources so they are not used excessively for the older generation.

If many people consider the benefits of such uses small or even non-existent, utilitarians would reasonably support preservation of the resources for future generations. In fact, it is not clear that these considerations would be limited to existing generations. Is the calculation of benefits and harms to include all future persons, whether presently living or not? If so, since the numbers involved are extremely large in comparison to the number who are terminally ill and needing life-sustaining technologies at any given time, the aggregate benefit of using the resources for future generations (through research and development of the causes and cures for the underlying conditions) will be very great. Golding (1972) among others has argued that those more than two or three generations in the future will be so different from us that it will be virtually impossible to predict their interests and that therefore they do not need to be taken into account. Others, such as Daniel Callahan (1971), are not as convinced of the radical discontinuity between our generation and future ones. At least when it comes to the desire of future generations to avoid end stage kidney disease, infections, dehydration, nutritional deficit, and sudden cardiac or respiratory arrest, it seems reasonable that those in the future are likely to desire to have these problems solved. Utilitarians thus must face the problem of how any expenditures on treatment of the present generation of the elderly can be justified.

Similar problems of intergenerational responsibility arise for maximin theorists and egalitarians. They must determine whether the present terminally ill elderly are among the worst off groups taking into account the existing younger generation and possibly future generations as well. Rawls (1971, p. 284-93) as well as others in philosophy and economics have worried a great deal about justice between generations. Since in Rawls's hypothetical contract methodology for generating the principles for the basic institutions of society no one knows into which generation he will be born, the result will be what Rawls (1971, p. 289) calls the "just savings principle" in which there is "an understanding between generations to carry their fair share of the burden of realizing and preserving a just society." Each generation tries "to piece together a just savings schedule by balancing how much at each stage they would be willing to save for their immediate descendants against what they would entitled to claim of their immediate predecessors" (p. 289).

Daniels (1982, 1983) sees the intergenerational responsibility problem as critical for for his hypothetical contract prudent saver model. He rightly sees health coverage for the elderly as essentially a scheme whereby each older generation is the beneficiary of the resources of the younger generation. If a plan providing age-relativized opportunities for health is once in place, even if the elderly did not get the same levels of coverage for life-sustaining technologies, everyone would be treated fairly. They would at least if every generation were of the same size and had the same level of resources to contribute. The intergenerational transfers would cancel out with each younger generation contributing, as it presently does in Medicare, to the support of the older generation.

Two problems are identified by Daniels, however. First during the start-up phase certain generations will be treated differently. If, for example, some of the life-sustaining technologies now available to the elderly were eliminated, a transitional generation would have paid, through Medicare or some successor insurance scheme, for high levels of services and yet not receive them. On the other hand, if some service such as hospice care or bypass surgery were suddenly included in the plan, some transitional generation that did not pay for such care would be the recipients. In either case, problems of fairness would arise that would be of concern to those working in a theory of distribution that is patterned.

Daniels also points out that all generations may not be equally equipped to pay for care for the elderly. Some paying generations may be quite small yet have to pay for care for an elderly generation that is large. Other generations may face the opposite demographics. Some generations may face long periods where economic conditions make it difficult to pay for care for the older generation. Daniels argues that from the point of view of a distribution system emphasizing equality, there would have to be adjustments so that the ratio of burdens to benefits was evened out. In any case, if a plan using age as a criterion for allocating life-sustaining technologies were suddenly institutionalized, adjustments would have to be made to deal with intergenerational responsibilities during the transition generations and between generations that had unequal abilities to support health care.

The discussions of Rawls and Daniels make clear that one of the key problems of intergenerational responsibility is the extent to which children bear responsibility for their parents in a direct way. Both recognize that the parental generation transfers resources to the younger generation during early years and that some reciprocal responsibility is borne by children for their parents during their old age. At the same time both place substantial limits on the obligation of the younger generation for the older. Rawls puts in in terms of the obligation of each generation to save for its immediate descendants. Daniels puts it in terms of way a prudent saver would allocate a life's resources. In both cases it is clear that limits exist on what would be transferred from the younger generation to the older. Callahan, taking a somewhat different perspective, sees government programs to meet the needs of the elderly as a way of easing tensions between generations, a tension that would otherwise result if the younger generation did not bear a responsibility for providing care for the older, but nevertheless remained in contact with them through family ties.

THE HEALTH CARE RESOURCES THAT CAN BE DISTRIBUTED

Each theory of distribution will have implications for the health care resources to be distributed. In order to examine those implications, it is necessary to have a catalogue of the the health care resources that can be distributed.

It is first necessary to recognize that different goods may need to be distributed on different bases. In fact, distributing one thing on one basis may be identical to distributing another thing on some other basis. For example, distributing health equally (to the extent we could) would sure require distributing health care very unequally.

Some of the literature on the allocation of health care resources makes an important distinction between distributing health and health care. While some literature (Blackstone, 1976; Sparer, 1976; Veatch, "Just," 1976; Daniels, 1979; President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, Securing, 1983) explores the concept of a right to health, it is now commonplace to point out that a right to health does not exist as a legal right. Moreover, health is not something that can be a right because, in some cases, it is impossible to make people healthy. For these reasons it is now generally considered more appropriate to speak of a right to health care. Moreover, some commentators (Macklin, 1976; President's Commission, Securing, 1983, p. 32) prefer not to speak of rights at all, but rather to address the underlying issue of the proper distribution of care. Thus this study and most commentators working in the area now speak of the allocation of health care rather than health.

A. The Distinction Between High and Low Technology

One of the most obvious ways of dividing the health care resources is between those that are "high" technologies and those that are "low." Under this classification dialysis machines, ventilators, resuscitation equipment, and some medications might be considered high, while skin care, touching, turning, some forms of nutrition and hydration, and communication could be considered low. The distinction is obviously arbitrary.

More significantly, according to most theories of distribution and most other ethical and philosophical analysis, the difference between high and low technology is not terribly important. There was a time, especially among clinicians, when this distinction was believed to be important. It was related to the language of "ordinary" and "extraordinary" means. Many clinicians believed (some still believe) that the higher the technology--meaning presumably the more complex--the more extraordinary.

It is important to realize that the philosophical, theological, and legal commentators (President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, Forego, 1983; Pope Pius XII, 1958, Congregation for the Doctrine of The Faith, 1980; Ramsey, 1970; Veatch, Death, 1976) never intended that a treatment be classified as extraordinary on the basis of how complex or how unusual it was. Rather a treatment was called "extraordinary" if it involved a grave burden for the patient or was useless for the patient. Sometimes (Congregation for the Doctrine of The Faith, 1980) now it is simply said that the burdens are disproportional to the benefits of the treatment.

Nevertheless to the extent that so-called high technologies are particularly expensive, experimental, or possessing a low probability of success, the label of "high technology" may be relevant for holders of various theories of distribution. To the extent that a high technology has high cost and low probability of success, a utilitarian is less likely to find the benefits of the treatment proportional to the burdens. Thus a high technology for utilitarians might be a suspect technology. Nevertheless some high technologies can offer very significant benefits for some patients including some elderly patients. The temporary use of a respirator as part of CPR for an elderly patient who is suffering an asthmatic attack, but who is otherwise healthy is surely a minimal investment with a very high likelihood of adding many years of high quality life to the patient. The fact that it is a "high" technology is not terribly relevant for utilitarians or holders of other theories of distribution.

For similar reasons the distinction between high and low technology may be important to the group of egalitarians who, using an over-a-lifetime perspective, are willing to use age as a criterion for interventions that are expensive, experimental, or with low probability of success, but insist on equal access regardless of age for those interventions that are relatively safe, inexpensive, and with a high probability of success. To the extent that the label "high" signals that the technology is in the former category, this would be important for holders of such a position. It is important to realize that the label is only a signal that the technology may fall into the category where age is a relevant distributional criterion. It is not a final division of the technologies.

B. Specialized Settings

In addition to distributing resources between high and low technologies, we can also speak of distributions among different health care settings. Some settings correlate with the use of the higher technologies. ICUs would be an extreme example. Hospitals would tend in this direction as well. On the other hand nursing homes and especially hospices offer more basic care of the sort thought of as low technology. When they do their jobs well, they provide comfort, pain control, and the basics of nursing care. They are likely to provide few of the life-sustaining technologies that are the focus of this study. Antibiotics, for example, would not normally be used in hospices. The same is true for dialysis and CPR. The only exceptions would be for comfort care. They are more likely to be providing hydration or nutrition, but increasingly it is being argued (In the Matter of Claire C. Conroy, 1983; Lynn and Childress, 1983; President's Commission on the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, Forego, 1983; Lynn, forthcoming) that these are expendable just as any other treatment is when they serve no useful purpose or when they are gravely burdensome. The only exception to this pattern is the recent lower court decision in the Brophy case in Massachusetts, which was decided very recently and is certain to be appealed.

It would appear that both utilitarian and the over-a-lifetime egalitarian theories of distribution would be more supportive of the life-sustaining technologies that are provided in nursing homes and hospices than those that are higher technologies used in ICUs and hospitals. There is no theory of distribution that would systematically exclude all life-sustaining technology for the elderly simply on the basis of the setting in which it is delivered.

C. Health Care Providers

Likewise, one may examine the way the various theories of distribution would treat alternative health care providers. It is important to realize that there are reasons other than those of theories of distributive justice why certain providers may be preferred. Nurses, for example, may operate under different philosophical and ethical commitments than physicians and may emphasize different kinds of care. Some patients choose nurse midwives for child birth while others prefer obstetricians. This may have nothing to do with the ethics of distribution of resources.

Different theories of distribution will place different emphases on different providers, however. Libertarians are likely to favor a policy of permitting persons to make deals with whatever providers they choose, provided only that the providers are willing to cooperate. Extreme libertarians even oppose restrictions such as those imposed by licensure laws.

Utilitarians will ask what the most efficient mix of providers is with efforts being made to assure that overly trained professionals are not providing services that can be provided at least as well by those with less prolonged training. They will even prefer lay providers and self-care when that is reasonable.

Maximin theorists and egalitarians differ sharply on the question of whether it is acceptable to divert resources to elites such as highly trained professionals in order to benefit the least well off. Maximin theorists provide the intellectual underpinnings for a trickle down approach that justifies high salaries for physicians and other skilled professionals when necessary in order to benefit the less well off. If the elderly are a least well off group then maximin theorists would in principle support increasing funds for research and development to improve the conditions of the elderly as well as higher salaries for nursing home personnel in order to improve the quality of the care offered.

Egalitarians, on the other hand, are much more skeptical of such moves. They would favor such arrangements only as a compromise when the less well off approved of the inequalities and even then they would consider a sacrifice of justice in order to benefit the less well off.

Maximin theorists and egalitarians who take the over-a-lifetime approach to determining who is least well off, but the slice-of-time approach for deciding who should get the basics of comfort care and simple, routine, effective treatments, would reasonably favor special priorities for nursing homes and hospices for the elderly, but may want to restrict more intense, expensive care. Egalitarians would be reluctant, however, to improve nursing home and hospice care by offering large financial incentives to staff. Rather they would support other kinds of improvements such as more lower paid staff and more direct expenditures on the patients themselves.

D. Support Systems Such as Families, Communities, Regions

Care will also need to be allocated to support systems for families, communities, and regions. Each theory of distribution will have its characteristic approach to this allocation: libertarians relying on private resources and charity letting the support systems develop where they may, utilitarians looking for maximum aggregate benefits, maximin theorists attempting to improve the position of the least well off, and egalitarians striving for greater equality.

Planners will need to distinguish between support systems that are designed to benefit the patient through providing support for the family and support systems that are designed to benefit the family or community itself. In some cases the position of the patient in the system and that of the family may be quite different. A severely afflicted patient may have a family that is reasonably well off economically, psychologically, and socially. Support systems would probably fit into the category of low technology services, the kind that will be favored by utilitarian and egalitarian approaches.

POSSIBLE BASES OF MACROALLOCATION

When contemplating a public policy for the macroallocation of resources in the health care sphere, a number of bases of distribution have been proposed. They have very different implications for the elderly. In this section of the report, a general classification of possible bases of distribution will be presented followed by an extended example from the DRG system.

A. Ten Possible Bases of Distribution

1. Equality

Some social goods are thought properly distributed when they are distributed equally, that is with each person getting the same amount. Votes in a democracy are distributed this way. Rawlsians believe liberty should be distributed this way. Libertarians would agree. Egalitarians would strive to distribute health this way recognizing that in some cases the goal would be impossible to fulfill because some people cannot be restored to health regardless of the most most heroic efforts.

It is unlikely that developers of a health care plan would want health care distributed this way. There was a national health insurance plan proposed in the 1970s which sought to give every citizen a lifetime $50,000 worth of health care. Such a scheme was driven by this notion of distribution on the basis of equality.

2. Proportionality

Some goods are thought properly distributed in proportion to some objective measure. Votes among share holders are distributed in proportion to the number of shares owned, for instance. In the health care sphere a general anesthetic might be thought to be distributed in proportion to the weight of patients.

In addition to these two more objective bases for distribution, a number of schemes have been proposed that take into account various talents, needs, psychological attitudes, and relationships with society.

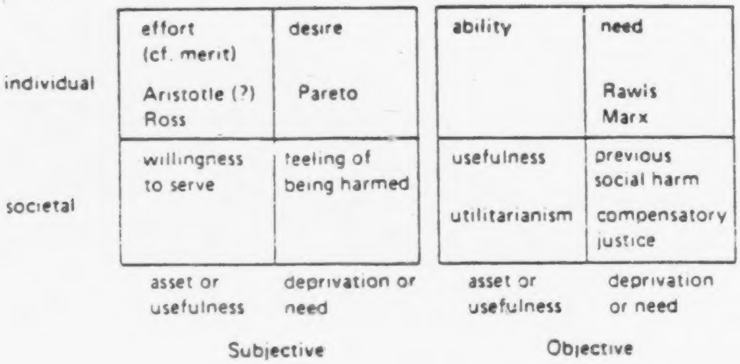
Figure 1 reveals eight of these bases of distribution, generated by three different two-way variables.

3. Need

Egalitarians and maximin theorists are oriented to need--an objective measure of individual deprivation. They approach allocation on the basis of need differently. Egalitarians distribute resources directly to the one in need. Maximin theorists may distribute resources to elites such as physicians or administrators as an incentive to get these elites to benefit the persons with greatest need. The result, in either case, is that resources are assigned with need as the reference point. Utilitarians may take need into account insofar as they include benefits to the individual in their utility calculus. The impact on the elderly of distribution on the basis of need will depend on whether the elderly are judged to be a particularly needy group.

4. Desire

The subjective correlate of need is desire. While health care would not normally be distributed on the basis of desire, desire would come into play at least insofar as a policy respected individual liberty to the point that persons could refuse care even if they needed it. Libertarian theories of distribution make greater use of desire as a basis for distribution when they permit individuals to trade freely in order to purchase what they desire and are able to buy in the marketplace. Pareto optimality (the optimality that exists when persons are permitted to trade until no one is able to improve his position by making exchanges with others also willing to trade) is a concept in economics that is grounded in libertarian theories of distribution in which desire dominates.



	Subjective		Objective	
	asset or usefulness	deprivation or need	asset or usefulness	deprivation or need
individual	effort (cf. merit) Aristotle (?) Ross	desire Pareto	ability	need Rawls Marx
societal	willingness to serve	feeling of being harmed	usefulness utilitarianism	previous social harm compensatory justice

Figure 1. The Bases of Macroallocation Distribution (Adapted from Veatch, "Just," 1976, p. 131).

5. Ability

Many macroallocation schemes refer to distribution on the basis of ability. Both utilitarians and maximin theorists might attempt to single out persons with ability in order to entice them into performing services that are beneficial to society. Upon closer examination, however, ability per se is not a plausible basis for distribution in these theories. An architect with great ability to help the elderly by designing new nursing homes would not properly be the recipient of resources even under utilitarian and maximin theory if he refused to use his abilities in socially useful ways. It is very unlikely that a terribly gifted pianist deserves rewards if that pianist refuses to develop her talents or to perform publicly. The elderly themselves are not likely to fare well if ability is the basis for distribution.

6. Social Usefulness

Rather it is social usefulness as a basis for distribution that people probably have in mind when they refer to ability. Social usefulness is ability combined with a willingness to serve society. Once again the elderly are not likely to fare well if usefulness to society is the basis for distribution. Even if subtle utilities such as the joys of life in the extended family and the nurturing that takes place across the generations is taken into account, a social usefulness case for giving the elderly priority in health care resource allocation is a difficult one to make.

7. Willingness to Serve

It is more complicated to determine whether willingness to serve per se deserves reward. Should, for example, a bungling soldier who attempts a daring mission but fails be rewarded with a metal? Should health care professionals who attempt difficult rescue efforts, but fail be praised? Surely, a certain degree of reward for such willingness to serve is important instrumentally. It will encourage others who may not fail to try similar feats. But other than instrumentally, is there a reason to reward those who are willing to serve, but lack the skill or luck necessary to succeed? Utilitarians and maximin theorists probably cannot give any reasons why there should be reward for other than instrumental considerations. Some persons, however, might take the view that positive moral motivation per se is praiseworthy and deserves reward.

8. Effort

Just as willingness to serve is the subjective correlate of usefulness, so ability also has a subjective correlate: effort. Effort is often thought to be rewarded justly when two people of equal ability exert different efforts. The one who works harder deserves the greater reward, according to some theories of justice. In the health care sphere effort enters into the analysis of the voluntary component of health status. It is increasingly realized that health status depends in part on voluntary choices. If two people have opportunities to exercise, avoid smoking, avoid carcinogens, etc., but one of them fails to do so, how does that effect his entitlement to the health care needed to overcome his medical problems?

Some commentators (Sperling, 1978; Veatch, 1980) have argued that smokers should be expected to pay for the costs of their free choice so that those who do not smoke are not made to bear the costs. Others (Crawford, 1978; Beauchamp, 1976) have argued that there is not sufficient evidence that smoking and other health risky behaviors are truly voluntary. They argue that there is a significant social component in the causal chain. If, however, there is a health risky behavior in which differences in free choice alone are responsible for different needs for health care, then distribution on the basis of effort is potentially relevant.

9. Previous Social Harm

Some theories of justice include what is normally referred to as compensatory justice. If persons have been wronged, according to this approach, there is a duty for the one who did the wrong to make amends. This applies at the level of the individual, but also at the level of the society. It is an argument frequently heard in conjunction with racial or sexual discrimination. Some people argue that blacks or women deserve a compensatory advantage to make up for previous discrimination.

It is difficult to determine whether the advantage is explicitly defended as compensatory. Need and utility are also bases for distribution. Persons who have been previously discriminated against are likely to have greater need. They are also likely to benefit more from resources. The question raised here, however, is whether in addition they also deserve a special component of resources as compensation for past wrongs.

Suppose that some of the elderly are thought to be victims of previous wrongful treatment by society. These elderly who have been treated wrongly in the past by society can be compared with elderly who have equal needs, but who have not been so treated. If need is the basis for distribution they receive the same amounts of resources from the society. If previous social harm is also a relevant basis for distribution, one group should get more than the other.

10. Feelings of Being Harmed

For the sake of completion, a final basis for distribution should be mentioned although it is unlikely that it is ever used. It is the subjective correlate of previous social harm, that is feelings of being harmed. It is hard to imagine any resource that is thought justly distributed on this basis.

B. The Example of Age and DRGs

These bases of distribution are likely to be used primarily at the level of macroallocation. Considerations such as these will help determine the budgets of the National Institute of Aging, research funds for Alzheimer's disease and other diseases of particular concern for the elderly, and chronic care facilities such as nursing homes, which cater particularly to the elderly. They will also be relevant to judgments about hospital reimbursement, levels of Medicare coverage, etc.

For example, the present prospective payment system that relies on diagnosis related groups (DRGs) for payment to hospitals (United States Department of Health and Human Services, 1984; Office of Technology Assessment, 1984) differentiates many diagnosis groups on the basis of age. For example, there are two separate DRG's for the diagnosis of "respiratory signs and symptoms without complications or comorbidity." Those patients are divided into two groups on the basis of age. The weights, upon which individual hospital reimbursements are calculated, reflect an age-related difference. DRG 99 is for patients over age 69. The weight is .8035. DRG 100 is for patients who are less than seventy years old. The weight is .7730. Many of the DRGs are similarly divided with the older age group getting a larger reimbursement in almost every case.

This is based in part on the well known fact that older patients are generally more costly to treat in any particular diagnostic category. They require more intense care and have longer hospital stays. But as a matter of macroallocation policy, a judgment must be made drawing on one or more of the bases of distribution we have analyzed.

It is not clear, for example, that the difference in weights is or should be exactly equal to the average difference in cost between the two age groups. The differences, which tend to be rather small, are in some cases not sufficient to make up the extra costs of treating the elderly. If one opted for a distribution solely on the basis of need, the weights would have to reflect the exact difference in caring for the older and younger populations.

On the other hand, reimbursement could be the same regardless of age reflecting the notion that each person with a particular diagnosis deserves the same reimbursement regardless of the cost of treatment. Some DRGs, in fact, reflect this commitment, the DRG for dialysis for example. It is not clear whether this is because it is believed that in these cases there is no difference in the cost of treatment as a function of age or whether the planners of the DRG weights decided that even though older persons cost more to treat, they would not be entitled to any additional reimbursement.

Still other bases of distribution would lead to policy judgments to assign different DRG weight ratios to different age groups. If one wanted to use cost-benefit analysis using expected years of life added as a criterion for assigning DRG weights, it is possible that younger persons would get much higher reimbursements than elderly persons. This would force on the local hospital an approach whereby hospital personnel would make a rudimentary effort to treat the elderly with simple, inexpensive procedures, while committing themselves to much more extensive interventions for younger persons with similar diagnoses.

The mechanism of age-linked DRG categories could easily be used to cut off care entirely for certain groups of elderly patients. If, for example, we wanted to adopt a policy of no dialysis over age 69 then DRG 317 (renal failure with dialysis) could be divided into two subgroups with the existing weight for the subgroup of patients under 70 and a new weight of zero for patients over 69. There is no reason why the age dividing line must be between the ages of 69 and 70. In fact, there are also age differentials between ages 17 and 18, but any other age-line could be chosen, for example differentiating between the young-old and the old-old.

POSSIBLE BASES OF MICROALLOCATION

Once the macroallocation policy is determined, for example, by assigning DRG weights, there is still the problem of allocation at the local level on a case by case basis. The DRG weights merely set a general pattern for reimbursement leaving it up to local institutional policies to determine exactly how much care should be given to any one patient in a particular DRG. In fact, at the present time, local institutions can cost shift from one DRG group to another. This would appear to defeat the allocational purposes of assigning DRG weights. DRGs are (or should be) given particular weights because a societal judgment is made that patients in that category on average deserve the particular amount of resources proportional to the weight assigned. If local officials purposely take some of those resources away from that group of patients and use them for another group, they are overriding the social judgment about what constitutes a fair allocation. At some point in the future the society will have to face the question of whether local institutions should be permitted to shift costs from on DRG to another.

Even within a single DRG, however, local officials will have to decide how to allocate the care among the patients in that group. This is just one example of how local hospitals and other facilities will have to make microallocation decisions (or have those decisions made for them by the broader public), determining who among the available patients will receive the available dialysis machines or respirators or who will receive limited resources for antibiotics, hyperalimentation, and parenteral fluids.

A. Microallocation on the Basis of Usefulness

At one point it was widely assumed that allocations, especially for major technological interventions such as dialysis, should be made on the basis of utility including explicitly the social usefulness of the recipient. Thus allocation committees took into account whether the patient had dependent children and whether he or she was engaged in a productive and useful career. The utilitarian theory of distribution drove the decision. The elderly have routinely been excluded on these grounds.

Problems arose both at the empirical level of trying to decide which of two candidates would really lead a more useful life on dialysis and at the level of ethics. People began to doubt that future usefulness of the patient was an ethically justified basis for the decision

B. Egalitarian Microallocation

In other context, especially the allocation of kidneys for transplant, the libertarian justification of ability to pay still today has some influence on the microallocation decision. For the most part, however, both the utilitarian and the libertarian justifications have given way to some type of allocation criteria that attempt to treat persons more equally.

It is widely held that medical need is one basis for more equitable allocation. We have already suggested that medical need is a criterion that does not entirely escape the utilitarian framework. The goal is still to maximize the good, but now the good is limited to the medical good. This is thought more acceptable, because medical good is believed to be independent of the social and value judgments that creep into broader judgments of utility. Whether that is, in fact, the case is increasingly open to question. Deciding what counts as a medical benefit and how much medical benefit comes from a particular intervention, in fact, also requires some value judgments that must draw on personal patterns of preference. Does adding ten years of life to a twenty year old count as the same medical benefit as adding ten years to an eighty year old? Suppose one has the choice of adding ten years of somewhat debilitated life to an eighty year old or adding five good years to a twenty year old. Deciding which offers more medical benefit is a value judgment pure and simple.

It is now common, especially in dialysis units, to opt for a two-tiered microallocation scheme in which patients are first sorted on the basis of whether or not they can benefit from the treatment and then selected on some other basis. Those adopting this policy are not aware of or ignore the fact that patients cannot be sorted cleanly into the groups that can benefit and those that cannot. Some patients will have a slight chance of benefit or will surely benefit but by a very small amount. Deciding whether to include or exclude a particular patient on the initial medical screening is much more a judgment call than many may realize.

Once the initial sorting is done on medical criteria, some other basis of allocation is necessary. These include:

1. Random Selection

Lotteries and other methods of random selection have the advantage of treating persons as having equal claim. It is an allocation method rooted in egalitarian premises and is often used when the good being divided (such as dialysis treatment, an opportunity to be resuscitated, or a course of antibiotic treatment) cannot be divided equally with each recipient getting proportional benefit. Life-sustaining technologies are by their nature often all or none interventions. Giving someone half the needed dialysis will not solve anyone's problem. Therefore, instead of allocating the treatment equally, sometimes it is necessary to allocate the chance of getting an adequate regimen equally. A lottery or some other random method of allocation is chosen.

2. Rationing

In other cases, when the good in question can be divided in such a way that each person gets proportional benefit, microallocation that is driven by more egalitarian considerations is done by rationing. If three patients each needed three pints of blood to do well but only six pints were available, the proper solution according to egalitarian considerations might be to give each patient two pints hoping each will do reasonably well that way. The life-sustaining technologies of this study are unlikely to be rationed in this manner. Parenteral fluids and nutritional support might conceivably be rationed in the case of a temporary local shortage. Resuscitative efforts might, in effect, be rationed if two patients went into respiratory arrest simultaneously and the one available resuscitation team divided its efforts between the patients. For the most part, however, rationing is not going to be relevant to the life-sustaining technologies in question.

3. Geographical Availability

Allocation on the basis of geographical availability is a kind of hybrid. It takes the geographical facts as a given and then allocates within the geographical region. The allocation within the region could be on any of the bases already described. Allocation of the basis of geographical availability seems to be built on the premise that the geographical distribution can be taken as a given. That, in turn, assumes no geographical interconnectedness and responsibility. Certainly for Medicare and other nationally based programs, these assumptions are very questionable.

C. Age-based Microallocations

In addition to the microallocation schemes already considered, it would be possible to base local allocation decisions explicitly on age. Apparently that is what is done in Britain and other countries regarding dialysis. Local decisions are made that are consciously age-based.

If a local hospital must allocate its dialysis machines or its DRG-generated resources among patients needing life-sustaining technologies or other health care services, it could consciously select on the basis of age or expected life-years added. Either system would leave the elderly in a very special situation. It is possible that the elderly could be given special advantage--perhaps on the grounds that a chronic care technology such as a dialysis machine will be tied up for a shorter period of time thus giving more people a chance to benefit. They might be given advantage on the grounds that the elderly deserve a special respect from the society. It is more likely that on utilitarian or over-a-lifetime egalitarian grounds they will be given lower priority for local level allocation. Whether local institutional officials should be able to make these kinds of policy determinations without the guidance of the broader society is an issue for debate. It can be argued that these are the kinds of decisions that should be made by the broader society at the national level. If that is the case, then the local level microallocation policy should be determined by public debate, rather than being left to the discretion of individual health care professionals and administrators.

PUBLIC POLICY OPTIONS

The basic policy question to be faced in conjunction with the problem of the possible use of age as a criterion for allocating life-sustaining technologies is whether to develop any conscious policy at all and, if so, how explicit that policy should be. Several general policy options are available.

A. General Policy Options

1. Ignore Age as a Matter of Policy

First, our society could decide consciously that it will act on policy matters as if age were not a factor. This is by far the least controversial policy at least on the surface. The advantage is that controversy is avoided or at least hidden. The disadvantage is that many official government policies including those within the health care sphere already include age as a criterion. Most obviously, Medicare it self is, for the most part, an age-based health care program. More specifically, we have seen that the DRGs in many cases use age as a criterion for reimbursement. It is not clear whether that is an attempt to make full adjustments for the fact that older patients are generally more expensive to treat or whether the adjustment is only partial so that older patients cannot, at the level of reimbursement offered, get care that will produce results at the same level as for younger patients.

Even setting aside existing policy, we have seen that many of the theories of distribution have implications that support the use of age as a criterion. Utilitarians would probably decrease the levels of certain kinds of care currently available to the elderly. They would at least use age or years of life added as a criterion for calculating the potential benefits of interventions. Libertarians would permit persons to buy services taking into account their own ages when they determine whether care is worth it to them. Some egalitarians and maximin theorists would even make use of age or age-correlates. Those following Daniels scheme would strive for age-relativized activity ranges, which mean different kinds of health care for different ages. Those striving to benefit the least well off might use over-a-lifetime well being determinations and conclude that the elderly are not high priority for interventions at least for certain kinds of care. While some who hold any of these theories of distribution may have reasons not to consider age as a criterion, others holding those positions would insist that age ought to be a factor.

2. Age as an Informal Policy

As a society, we could still let age play a role as a matter of informal policy. Following the example of the British we could, through public and professional discussion, reach an informal agreement that age should be taken into account on an ad hoc basis by individual clinicians, administrators, or family in deciding who should be resuscitated, who should get dialysis, etc. The advantage of this is that it deals with the realities of age and yet avoids a formal public debate. The disadvantage is that, as in Britain with dialysis, different elderly persons who are medically similar will be treated very differently depending on what institutions they happen to be in, what the whim of the individual professional is, and what the personal ability of the patient is to persuade providers to deliver the desired service. For utilitarians who believe that ability to persuade is a correlate of social usefulness this may not be a problem, but for maximin theorists and egalitarians there would likely be objection to allocations on the basis of these factors.

3. Conscious Policy

If neither of these is acceptable, then a conscious policy would be in order. Policies could be adopted on a case-by-case basis such as a policy that permits no use of CPR on permanently comatose elderly patients or no dialysis over a certain age. A more ambitious, systematic policy might someday be in order such as the one suggested by over-a-lifetime egalitarians who would exclude all expensive, experimental, or low probability treatments over a certain age.

Another approach is suggested by the contract models. Libertarians would probably support a policy whereby all health insurers offered alternative coverages with one including and the other excluding certain life-sustaining technologies for the elderly. Individuals, by free choice, could then choose whether they would be covered during old age. Unions and other employee groups could negotiate insurance plans deciding whether such coverages were to be included, possibly offering certain groups of life-sustaining technologies during old age only as an optional coverage. Those influenced by Daniels hypothetical egalitarian contract would strive for public participation in a debate over whether various life-sustaining technologies were part of age-relativized health care coverage.

B. Areas of Congressional Action

The debate over the use of age as a criterion for allocating care is both new and complex. The implications of different theories of distributive justice are not yet well understood. Extensive, rapid Congressional action would probably be premature. On the other hand, the issues are so important to the public and so controversial that if policies are eventually adopted that would use age as a criterion for allocating life-sustaining technologies, they should be the result of extensive public discussion and a formal public decision-making process. These issues are so fundamental that Congressional action should be required rather than leaving them to administrative or professional decision-makers whether at the national or local level.

Nevertheless, there are several activities where immediate action is possible. There are others where it is appropriate to begin exploration of policy options. Finally, there some long-term policy alternatives that society is not yet ready to debate formally, but for which preliminary discussion and serious reflection needs to begin.

1. Activities for Immediate Action

While it is probably premature to adopt any formal policies using age as an explicit criterion for allocating any of the life-sustaining technologies that are the focus of this study, it is essential that some studies be initiated. In fact, for some of them, if they are not begun immediately it will be too late. The lead-time to develop a well-thought-out policy will be lost or the important data will no longer be available.

a. Identify and Study Existing Age-based Allocation Policies. Several existing age-based allocation policies are presently in place in the United States and elsewhere. These need to be identified and studied both to determine how they work empirically and what the moral underpinnings are that led to their adoption. The most relevant is the use of age as a criterion for determining reimbursement in the Medicare system. First, on what grounds was it determined that elderly persons (including those who were not needy) had a claim on the public and on future generations for extensive medical insurance. Why was it acceptable to include the elderly, who were the most expensive age group to treat, but, with special exceptions, no other age groups? With the implementation of DRGs, why were some (but not all) diagnostic groups divided by age? Was the differential in reimbursement based exclusively on empirical differences? If so, what justifies continuing to maintain those differentials? Why are some DRGs without age-based differentials? What moral justifications, if any, are there for continuing to use age as a basis for allocation in these existing cases?

Such an investigation need not be limited to the United States. It would be extremely important to know whether the differences that exist from one country to another over willingness to use age as a criterion for allocating resources rest on differences in beliefs about empirical facts (such as whether dialysis will be successful in elderly persons) or whether they reflect differences in morality, in theories of distributive justice.

b. A Prospective Study of the Use of Age as A criterion in Allocating Heart Transplant Funding. These same questions can be asked prospectively as the United States begins its first formal experiment in using age as an allocation criterion in DRG 103 (heart transplants). If transplants are approved only for Medicare patients who are no older than 55, this will be the first formal policy in which there is an absolute prohibition on funding solely on the basis of age. This contrasts with the existing age-based policies where the amount of reimbursement is a function of age, but not total right of access. It is crucial to determine why such a policy is adopted at the time of its adoption. Is it strictly pragmatic--with policy makers reasoning that there are very few Medicare patients under 55 needing heart transplants? Is it quasi-empirical, with decision-makers believing that transplants for patients over age 55 will not be successful? Is it based on the belief that the payoffs in terms of years of life added or future usefulness to the society of those over 55 does not justify funding transplants? Is it because those over 55 have had long lives already so that priorities need to be placed elsewhere? Congress could mandate a prospective study of the use of the age criterion in the heart transplant case as a way of anticipating problems arising if it were used for the life-sustaining technologies that are the focus of this study.

c. A Comparison of the Use of Age as a Criterion with Other Uses of Sociological Categories. Since age is an ascribed sociological category, it would be important to determine how the use of age as a selection criterion for life-sustaining technologies compares with other uses of ascribed social categories. Age, for example, is used as a criterion for retirement. On the one hand it is normally considered unjust discrimination to use an automatic maximum age for hiring and firing decisions. On the other hand, compulsory retirement at a specified age, though controversial, is still widely accepted. How does the use of age as an automatic exclusion criterion in these cases compare to its use in allocating life-sustaining technologies? Also, we have a long history of the use of using the ascribed social categories of sex and race as selection criteria. Do the legal and ethical arguments that prohibit many uses of sex and race as automatic exclusion criteria also apply to the use of age? If there are special cases where sex and race can be used as legitimate criteria, are their analogous cases where age could be used?

d. Determine the De Facto Role of Age in Clinical Choices. Although at present there is no formal policy using age as a clinical criterion of allocating care, it is widely believed that clinicians and administrators often consider age in making judgments. Studies need to be commissioned to determine what role age is really playing. For example, it might be possible to learn something about the role of age in various hospitals by comparing the age ratios of admissions to the age ratios for various procedures within a hospital. If two institutions have identical percentages of elderly patients admitted as end stage renal patients but the percentage of dialysis patients who are elderly varies considerably, the results would be very suggestive. Also, empirical studies might be able to determine why clinicians are using age--whether it is because of beliefs about the medical outcomes or some other reasons.

2. Policy Options for Exploration

In addition to the research issues, there are policy options for which debate is appropriate. Several actions may eventually be appropriate for Congress although these issues are so controversial and so complicated that immediate action is probably not appropriate.

a. Using DRG's as a Way of Allocating on the Basis of Age. A policy could be adopted that DRG weights should be used as a way of conveying public judgments about allocating of resources. If so, it is plausible that it should be policy that the DRG weights should be proportional to the just claims of patients in various groups. Congress could consider the question of whether DRGs should be separated on the basis of age with different reimbursement weights going to patients of different age and, if so, what a fair basis of assigning weights is. For example, it could be determined that elderly patients should be in separate DRGs with weights exactly proportional to the expected additional cost to give the elderly patient results comparable to other patients. Alternatively, weights could be assigned to the DRG for elderly patients that are much less than for younger patients reflecting the policy judgment that elderly deserve relatively little care. Still another alternative would be to make the weight for elderly patient exactly equal to that of other patients (or alternatively collapsing the two DRG's into one group). This would reflect the policy judgment that all patients deserve the same amount of care regardless of the fact that elderly patients on average require more intense care to accomplish similar results.

b. Policies Differentiating Optional and Required Care. Congress could also begin exploration of policy positions regarding kinds of care that are required for all persons regardless of age. This could be on the presumption of consent from the patient or guardian or could conceivably be required for all patients even against their consent. Among the kinds of care that Congress might want to mandate for all patients regardless of age would be comfort care, basic nursing care, pain medication, nutrition, and hydration.

c. Extending Federal Allocation Principles to Private Insurers. Congress might want to begin exploring the possibility of extending its federal allocation criteria regarding the elderly, whatever they may be, to private insurers. Under such an action Congress might mandate, for example that no insurer, public or private, could exclude on the basis of age, certain kinds of care from patients it insures. The kinds of care could be similar to those mentioned above.

d. Development of Methods for Determining Public Consensus. Finally, Congress might begin exploring methods for determining public consensus on what care must be offered to patients regardless of age. Two schemes have been reviewed that require some method of reading the judgments of the population. Daniels scheme of age-relativized opportunity ranges requires knowledge of what opportunities are typical for persons of different ages. The egalitarian case for using age requires determining which kinds of care are so basic (so inexpensive, effective, and beneficial) that age should not be taken into account and which might be excluded from the elderly on the grounds that over-a-lifetime the elderly are relatively well off in comparison to others needing the resources. Both of these devices require a method for determining which care is basic.

3. Long-term Policy Alternatives

All of the possible actions mentioned thus far avoid any actions by Congress that would actually ban care on the basis of age. The first group would provide important data. The second group would move toward policy, but would not identify actual care categories to be excluded on the basis of age. It is also appropriate for Congress to begin exploring the question of whether categories of care could be established that could be excluded on the basis of age. Several broad options have been mentioned in the public debate:

a. Develop a Policy that No Care Be Allocated on the Basis of Age. As discussed above this would avoid many difficulties for Congress, but probably is not realistic. A patient who is 93-years-old, has multiple diseases, and a very short life-expectancy. She had heart problems that might call for by-pass surgery in a younger patient. She wants the surgery and a surgeon is willing to provide it. Should Medicare adopt a policy that says that her age should not disqualify her from the surgery. If so, should Congress instruct Medicare administrators to exclude such age-based considerations?

b. Requiring Optional Insurance for Life-Sustaining Technologies for the Elderly. Congress could require that all insurers, public and private, separate off certain life-extending technologies and offer insurance coverage for persons over a pre-determined age on an optional basis. Thus every insured person could choose whether or not he or she wanted insurance for dialysis over the age of seventy-five and would have to pay an extra premium out of pocket if the coverage was desired.

c. Development of a List of Treatment not to be Funded for Elderly Persons. Finally, Congress could begin exploring the question of whether there are any categories of treatment that are so implausible that insurers, at least government insurers such as Medicare, would not cover them. While the proposal seems radical, in fact, Medicare excludes many kinds of coverage today and probably will soon exclude specifically on the basis of age. Among the categories that could be debated are:

(1) Heart Transplants
(2) Other Organ Transplants
(3) Prolonged Mechanical Ventilation for Patients in a Permanent Vegetative State
(4) CPR for patients with less than 24 hours life-expectancy
(5) Antibiotics for patients with less than a specified number of days of life expectancy
(6) Dialysis for patients over a given age

It would be important that if such a list were debated, it be in conjunction with the earlier proposals to debate categories of treatment which could not be excluded on the basis of age. Otherwise, the discussion would simply be a one-sided emphasis on exclusions.

These are obviously extremely controversial proposals. The present author is not advocating any one of them. He is suggesting, however, that allocation is, in fact, being made on these bases already and that debate over the question of whether age is an appropriate criterion for exclusion is so important that, if anyone is to make the policy formal, it ought to be Congress.

C. Adequacy of Existing Federal Programs in Achieving Just Allocation of Resources

Determining where existing federal programs achieve a just allocation of resources will depend in large part on the theory of distribution one favors. It seems likely that holders of none of the major positions, libertarian, utilitarian, maximin, and egalitarian, will be completely happy with the current situation. They will differ over whether the elderly are getting too much care (some utilitarians and egalitarians) or too little care (slice-of-time egalitarians) or just having their free market choices too heavily controlled (libertarians).

The most serious problem at the present time may be inconsistency in the use of age as a criterion. It is clear that many professionals and many institutions have de facto policies of discouraging care when patients are elderly while others, especially those in fee for service arrangements, may actually over-treat.

D. Changes in Reimbursement Systems

At the national level there needs to be a much more conscious formulation of a policy on the role of age as a criterion in reimbursement. No one seems to be reflecting consciously on the use of age breaks in the DRG system. Is the goal simply to provide coverage for extra costs in treating the elderly in which case the additional weight should be proportional to the extra costs or should the weights reflect a compromise between the goals of equal results and more utilitarian considerations of efficiency? Should the weights for certain DRGs purposely be lowered for elderly patients as a way of excluding them from care? This, in effect, is what is done for heart transplants. The DRG weight for heart transplants is zero, which means a policy has been adopted that those over sixty-five (at least those funded by Medicare) will not get heart transplants.

The present reimbursement raises even more provocative questions for microallocation at the local level. Once a policy has been adopted at the national level for Medicare, it is hard to see why local officials should be permitted to shift costs from one DRG to another and from one age group to another. Similar questions arise within DRGs. Should local officials be permitted to shift costs within a DRG from one patient to another without having guidelines for doing it?

Likewise, cost shifts between Medicare and non-Medicare patient groups raise important policy questions. Libertarians, utilitarians, and more egalitarian theorists would all have positions on the legitimacy of such shifts. Very little guidance exists at the present time for such judgments.

Finally, should all payers be subject to the same standards for reimbursement? In particular should the elderly be treated the same way regardless of whether they are in Medicare. Libertarians probably would see no reason why they should, but probably both utilitarians and egalitarians would. If policies are adopted using age as a criterion, it will be crucial to determine whether all payers should be treated similarly. If age becomes a criterion for Medicare, but not for other payers then cost shifts and free market forces will combine to create some very complex problems and unanticipated outcomes.

CONCLUSION

As long as humans had very little capacity to prolong the lives of the elderly, the policy issues were not terribly difficult. The development of life sustaining technologies that have the capacity to prolong the lives of many elderly patients poses policy choices that are both unique and complex. The combined costs of the use of the technologies under consideration for this study is several billions of dollars per year in the United States alone. If the moral reflection were expanded to include consideration of the responsibility of the human community for all citizens of the world, the costs would be even more staggering.

If these technologies guaranteed continued life at what everyone agreed was high quality, the controversy would not be as great (or at least would not be the same). The fact is that many (but not all) are convinced that some uses of the technologies being reviewed in this study offer very little benefit and do so at very high cost. In fact, some uses are believed by some people to actually do more harm than good. The analysis is complicated by the fact that the elderly are disproportionate users of these technologies and that, even if the life-sustaining intervention were completely successful, the predicted life expectancy of the recipients is still relatively short.

All of this has led to a sense that some limits on the use of these technologies is inevitable, whether through ad hoc local decisions in the absence of any public debate or through more public consensus formation leading to either formal or informal policy. Age is already used as an explicit criterion for allocating health care and health care reimbursements (in Medicare, in many DRGs, in hospital policies for allocating dialysis, and, in all likelihood, very soon for the allocation of Medicare funded heart transplants). The recognition that age is explicitly used as a criterion suggests that the time has passed when we could pretend that age was always irrelevant. The real choice seems to be between ad hoc local policies and more public ones.

What those policies will be will depend heavily on the theory of distributive justice adopted. Each of the four major theories examined in this study has concrete implications for the use of age as a criterion for allocating life-sustaining technologies. At times there is a convergence so that, for example, both utilitarians and over-a-lifetime egalitarians might agree on limiting expensive, low probability of success technologies for the elderly even though they would not agree on the reasons. Understanding how the different theories of justice impact on the policy judgments will be important if our national policy is to be a reasonable and compassionate one.

One thing seems clear. No one is advocating either of the extreme positions regarding the use of age as a criterion. No one is arguing (at least publicly) that no care at all is appropriate for the elderly. Everyone supports at least the basics of relief of pain and suffering and basic nursing care for cleanliness and comfort. Even the most extreme libertarian would favor that although some may insist that it be provided through charity. On the other hand, no one is arguing that every elderly patient is entitled to every use of every life-sustaining technology that is available. Age cut offs for heart transplants and age differentials for DRGs are already with us. Age is an explicit criterion for allocating dialysis in other countries and appears to be an informal criterion at some institutions in the United States. Many people are exploring more explicit use of age criteria for allocating life-sustaining technologies while others are very reluctant to do so. In either case, the positions being adopted reflect the theories of justice described in this report.

References

Aristotle, *Nichomachean Ethics*, Ostwald, Martin, trans., (Indianapolis: The Bobbs-Merrill Company, Inc., 1962).

Avorn, Jerry, "Benefit and Cost Analysis in Geriatric Care: Turning Age Discrimination into Health Policy," *New England Journal of Medicine* 310(May 17, 1984):1294-1300.

Barry, Brian, "On Social Justice," *The Oxford Review* (Trinity Term, 1967):33-43.

Barry, Brian, *The Liberal Theory of Justice: A critical examination of the principal doctrines in A Theory of Justice by John Rawls*, (Oxford: Clarendon Press, 1973).

Bayer, Ronald, Daniel Callahan, John Fletcher, et al., "The Care of the Terminally Ill: Morality and Economics." *The New England Journal of Medicine* 309(December 15, 1983):1490-1494.

Beauchamp, Dan E., "Public Health as Social Justice," *Inquiry* 13(1976):3-14.

Beauchamp, Tom L., *Philosophical Ethics: An Introduction to Moral Philosophy*, (New York: McGraw-Hill Book Company, 1982).

Beauchamp, Tom L., and James F. Childress, eds., *Principles of Biomedical Ethics*, 2nd ed., (New York: Oxford University Press, 1983).

Bentham, Jeremy, "An Introduction to the Principles of Morals and Legislation," in *Ethical Theories: A Book of Readings*, A. I. Melden, ed., (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967, pp. 367-390).

Blackstone, William T., "On Health Care as a Legal Right: Philosophical Justifications, Political activity, and Adequate Health Care," *Georgia Law Review* 10(Winter 1976):391-418.

Bleich, J. David, "The Obligation to Heal in the Judaic Tradition: A Comparative Analysis," in *Jewish Bioethics*, Fred Rosner, and J. David Bleich, eds. (New York: Sanhedrin Press, 1979, pp. 1-44).

Buchanan, Allen, "Justice: A Philosophical Review," in *Justice and Health Care*, Earl Shelp, ed., (Dordrecht, Holland: D. Reidel Publishing Company, 1981, pp. 3-21).

Callahan, Daniel, "What Obligations Do We Have to Future Generations?" *American Ecclesiastical Review* 164(April 1971):265-80.

Childress, James, "Ensuring Care, Respect, and Fairness for the Elderly," *Hastings Center Report* 14(No. 5, 1984):27-31.

Congregation for The Doctrine of The Faith, *Declaration On Euthanasia*, (Rome: The Sacred Congregation for the Doctrine of the Faith, May 5, 1980).

Crawford, R., "Sickness as Sin," *Health Policy Advisory Center Bulletin* 80(1978):10-16.

Daniels, Norman, "Am I My Parents' Keeper?" *Midwest Studies in Philosophy* 7(1982):517-540.

Daniels, Norman, "Am I My Parents' Keeper?" in President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research. *Securing Access to Health Care*, vol. 2, (Washington, D.C.: U.S. Government Printing Office, 1983, pp. 265-291).

Daniels, Norman, "Rights to Health Care and Distributive Justice: Programmatic Worries," *Journal of Medicine and Philosophy* 4(June 1979):174-191.

Engelhardt, H. Tristram, "Health Care Allocations: Responses to the Unjust, the Unfortunate, and the Undesirable," in *Justice and Health Care*, Earl E. Shelp, ed., (Dordrecht, Holland: D. Reidel, 1981, pp. 121-37).

Fried, Charles, "Equality and Rights in Medical Care," *Hastings Center Report* 6(February 1976):29-34.

Golding, Martin, "Obligations to Future Generations," *The Monist* 56(January 1972):85-99.

In the Matter of Claire C. Conroy, Superior Court of New Jersey, Chancery Division, Essex County, Docket No. P-19083E, Decided February 2, 1983.

Lynn, Joanne, *The Choice to Forgo Life-Sustaining Food and Water: Medical, Ethical, and Legal Considerations*, (Bloomington, Indiana: Indiana University Press, forthcoming).

Lynn, Joanne, and James F. Childress, "Must Patients Always be Given Food and Water?" *The Hastings Center Report* 13(October 1983):17-21.

Macklin, Ruth, "Moral Concerns and Appeals to Rights and Duties," *Hastings Center Report* 6(No. 5, 1976):31-38.

Moody, Harry, "Is it Right to Allocate Health Care Resources on Grounds of Age?" in *Bioethics and Human Rights*, Bertram Bendam and Elsie Bandman, eds., (Boston: Little, Brown, Inc., 1978, pp. 197-201).

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, *The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research*, (Washington, D.C.: U.S. Government Printing Office, 1978).

Nielsen, Kai, "Radical Egalitarian Justice: Justice as Equality," Social Theory and Practice 5(2):209-226.

Nozick, Robert, Anarchy, State, and Utopia, (New York: Basic Books, Inc., 1974).

Office of Technology Assessment, "Medical Technology and Costs of the Medicare Program," Report, (Washington, D.C.: Government Printing Office, July 1984).

Pope Pius XII, "The Prolongation of Life: An Address of Pope Pius XII to an International Congress of Anesthesiologists," The Pope Speaks 4(1958):393-398.

President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, Securing Access to Health Care, vol. 1, (Washington, D.C.: U.S. Government Printing Office, 1983).

President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, Deciding to Forego Life-Sustaining Treatment: Ethical, Medical, and Legal Issues in Treatment Decisions, (Washington, D.C.: U.S. Government Printing Office, 1983).

Prottas, Jeffrey, Mark Segal, and Harvey M. Sapolsky, "Cross-National Differences in Dialysis Rates," Health Care Financing Review 4(No. 3, March 1983):91-103.

Ramsey, Paul, The Patient as Person, (New Haven, Connecticut: Yale University Press, 1970).

Rawls, John, "Justice as Fairness," Philosophical Review 67(1958):164-94.

Rawls, John, A Theory of Justice, (Cambridge, Massachusetts: Harvard University Press, 1971).

Rice, Dorothy P., and Barbara S. Cooper, "The Economic Value of Human Life," American Journal of Public Health 57(November 1967):1954-1966.

Ross, W. D., The Right and the Good, (Oxford: Oxford University Press, 1939).

Sade, Robert M., "Medical Care as a Right: A Refutation," New England Journal of Medicine 285(1971):1288-1292.

Sidgwick, Henry, The Methods of Ethics, (New York: Dover Publications, Inc., 1966).

Siegler, Mark, "Should Age Be a Criterion in Health Care?" Hastings Center Report 14(No. 5, 1984):24-27.

Sparer, Edward V., "The Legal Right to Health Care: Public Policy and equal Access," Hastings Center Report 6(October 1976):39-47.

Sperling, Godfrey, "Let Smokers Pay for their Habit," Christian Science Monitor, (January 30, 1978):7.

United States Department of Health and Human Services. Health Care Financing Administration, "Medicare Program: Prospective Payment for Medicare Inpatient Hospital Services. Final Rule." Federal Register 49(January 3, 1984):234-334.

Veatch, Robert M, "Ethics and the Elderly," Contemporary Issues in Gerentology, David Schnall, ed. (New York: Praeger Publishers, forthcoming).

Veatch, Robert M., "Voluntary Risks to Health: The Ethical Issues," Journal of the American Medical Association 243(January 4, 1980):50-55.

Veatch, Robert M., "What is a 'Just' Health Care Delivery?" Ethics and Health Policy, Robert M. Veatch and Roy Branson, eds., (Cambridge, Massachusetts: Ballinger Publishing, 1976, pp. 127-153).

Veatch, Robert M., Death, Dying, and the Biological Revolution, (New Haven, Connecticut: Yale University Press, 1976).

Veatch, Robert M., editor, Life Span: Values and Life-Extending Technologies (San Francisco: Harper and Row, Publishers, 1979).

Wing, A. J., "Why Don't the British Treat More Patients with Kidney Failure," British Medical Journal 287(No. 6400, October 22, 1983):1157-1158.

Zeckhauser, Richard, and Donald Shepard, "Where Now for Saving Lives?" Law and Contemporary Problems 40(1976):5-45.

LIFE-SUSTAINING TECHNOLOGIES AND THE ELDERLY

THE LEGAL ISSUES

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June, 1986

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LIFE SUSTAINING TECHNOLOGY AND THE ELDERLY; THE LEGAL ISSUES

INTRODUCTION

A. THE LAW

Laws define or reflect what society considers to be morally appropriate and acceptable behavior. In a complex and technologically advanced society, there are continuous challenges to the foundations which underlie the law. When moral norms are uncertain, or in conflict, the legal rules and statutes of different jurisdictions may reflect this diversity of opinion. When consensus has been reached, the case law and statutes of most jurisdictions are essentially the same.

The case law and statutes which address the physician-patient relationship present examples of both moral consensus and divergence. Certain fundamental and agreed upon principles, however, are clearly and uniformly reflected in the laws of all jurisdictions. The rules which define the rights of patients, and the responsibilities of physicians, within the context of a prescribed fiduciary relationship, have been accepted and sanctioned by all parts of society.

For example, it is now without legal contest, with the support of both the Common Law and Constitutional law, that adult patients of "sound mind" have the right to bodily integrity and self-determination. They have the right to determine what medical interventions shall or shall not be applied to their bodies. Given that patients have this right, physicians therefore have the corresponding obligation to obtain the consent of their patients before they may begin a diagnostic procedure or therapeutic intervention. This rule of necessary consent was built upon a centuries old legal consensus that there can be, in general, no unconsented to "touching" of a patient by a physician.

Consent, however, is not merely the articulation of an affirmative response. "True consent to what happens to one's self is the informed exercise of a choice, and that entails an opportunity to evaluate knowledgeably the options available and the risks attendant upon each." (Canterbury, 1972). Physicians consequently have the duty to share information with their patients: a duty to disclose the diagnosis, the proposed treatment, the risks and benefits of that treatment, the availability of alternative treatments and their risks and benefits, and the consequences of not intervening at all.

A necessary corollary of the competent patient's right to be informed and give consent is the right to refuse treatment, even if the consequence of the refusal leads to serious harm or death. Although in a minority of cases this right may be overridden by certain compelling state interests, it is clearly supported by both Common Law and Constitutional concepts. The choice of the patient to refuse treatment, however,should be arrived at in the same manner as the choice to consent: it should be an informed action. A refusal should not be accepted by the physician without full disclosure of all the attendant options and risks.

These patient empowering principles stand firmly etched in our statutes and case law. They provide guidance and direction for both physicians and patients. Despite this firm legal foundation, there is often tremendous uncertainty and anxiety among caregivers regarding their obligations to patients and their permissible range of independent action as physicians. The traditional paternalism that has historically infused the delivery of medical care still retains its grip on modern day providers. Much of the unclarity results from the fact that technological progress has outpaced the legal process. Contemporary dilemmas of medical practice often evade quick and easy resolution by law. Despite this fact, this chapter will address the present state of the law with regard to the use of life-sustaining technology and the elderly.

B. The Elderly

As a characteristic in and of itself, age is an inappropriate marker for distinguishing one patient from another. In general, all adult patients should be treated equally: their right to self-determination should be respected, their need to be informed before consenting to or refusing treatment should be honored and their capacity to make such treatment decisions should be assumed. Adults who are not congenitally retarded are generally presumed legally competent to manage their affairs unless and until they are declared incompetent by a court of appropriate jurisdiction. The elderly are no exception.

This does not, however, negate the need to recognize the potential vulnerability of the elderly patient. There are numerous reasons why special attention to, and protections for, the elderly patient are often necessary. For example, the voice of the elderly patient in an acute or chronic care environment may be softer than the voice of a younger patient. As a consequence it may have less impact upon the caregiver. The elderly patient's capacity to make decisions may fluctuate and may be dependent upon such diverse factors as the type and degree of dementia, their toxic metabolic reactions to illness and medications, the strangeness of the environment or even the time of day. Inability to make a decision at one point in time does not, however, preclude the ability to make that same decision at another point. Capacity to make health care decisions is "decision specific," that is, decisions involving more complexity or greater risk may require greater ability.

The caregiver of the elderly patient must, however, walk a fine line between respecting the elderly patient's right to make decisions and protecting the patient from "abandonment," i.e., unscrutinized decisions to impose or withhold care. For example, a superficial nod to the tenets that underlie the right of adult patients to be informed, and to give or withhold consent, could leave a cognitively impaired elderly patient at the mercy of a non-autonomous decision. If the elderly patient does not possess the capacity to process the information necessary to render consent or refusal (see discussion of "Competency," below), then the caregiver's acceptance of this patient's articulated choice, simply because patients generally do have the right to make these choices, may constitute a mere mockery of the principles that underlie the concept of informed consent. Patients who unknowingly make harmful choices need support and protection. The caregiver must therefore guard against this potential isolation of the decisionally incapable elderly patient, while at the same time respecting the right of those elderly who can make health care decisions for themselves.

THE LEGAL CONCEPTS THAT EMPOWER THE PATIENT

A. COMMON LAW CONCEPTS

I. Battery

In medieval England (the source of much of American Common Law) the interactions between physicians and patients were considered "touchings." Physicians were obliged to obtain the consent of the patient before attempting to touch and heal. If consent was not obtained, the physician could later be found guilty of having committed a "battery," i.e., a harmful or offensive nonconsensual touching for which he could be liable to the patient for money damages.

The law placed little emphasis, however, on the quality of the patient's consent. The focus of the law's concern was on the technical administration of an unconsented to procedure. The patient's comprehension of the nature of the touching commanded little attention or respect. Although the physician could not obtain consent through deceptive or fraudulent methods, there was no encouragement for the caregiver to provide more than a superficial description of the impending procedure. The patient could be monetarily compensated for injury through a tort suit after the fact, but the physician was not obligated to provide much information material to the planned "touching."

II. The Right of Self-Determination

American case law has long recognized an individual adult's right to be a "master" of himself; that is, an individual has the right to control and choose what happens to his own person. As early as 1891, the United States Supreme Court endorsed this fundamental right. "No right is held more sacred or is more carefully guarded by the common law than the right of every individual to the possession and control of his own person, free from all restraints or interference by others, unless by clear and unquestionable authority of law." (Union Pacific Railway Co. v. Botsford, 141 U.S. 250 (1891).

In the context of the doctor-patient relationship, this fundamental right of personal control was first clearly endorsed in the 1914 opinion of Justice Cardozo. "Every human being of adult years and sound mind has the right to determine what shall be done with his own body." (Schloendorff). A strong and explicit restatement of this right appeared in the landmark informed consent case, Natanson v. Kline." "Anglo-American law starts with the premise of thoroughgoing self-determination. It follows that each man is considered to be master of his own body and he may, if he be of sound mind, expressly prohibit the performance of life-saving surgery, or other medical treatment." (Natanson, 1960).

The individual patient's right of self-determination is now firmly rooted in American case law and statutory law. It is one of the basic concepts underlying the patient's right to be informed, and it clearly supports the right of adult patients to consent to, or to refuse, proposed medical treatments. All recent courts that have ruled upon the adult patient's right to make health care decisions have unhesitatingly endorsed this right of self-determination.

The term "self-determination" is often used interchangeably with the philosophical concept of "autonomy." The roots of "autonomy" come from the Greek words autos, meaning "self" and nomos, meaning "rule." The original intent was to denote the self-governing characteristic of Greek city-states. As applied to individuals, autonomy represents the concept of self-rule and independent action. The ethicists Beauchamp and Childress have defined the autonomous person accordingly: "The autonomous person determines his or her course of action in accordance with a plan chosen by himself or herself. Such a person deliberates about and chooses plans and is capable of acting on the basis of such deliberations." (Principles of Biomedical Ethics (1983)).

The value and respect that Western philosophy and ethics have traditionally given to the concept of individual autonomy underlie the common law right of self-determination, which in turn supports the adult patient's right to give or withhold consent. Since society strongly endorses the notion that individuals are free to deliberate about their options, chart their own course and act on the basis of their choice, then it logically follows that individuals require both the information that allows them to fully consider their options and the freedom to act according to their decision. Physicians grant patients the dignity and respect that are due all persons when they share information with patients and abide by their fully informed choices.

B. CONSTITUTIONAL CONCEPTS

I. The Right of Privacy

The concept of a personal right of privacy first appeared in an 1890 Harvard Law

Review article co-authored by Louis Brandeis and Samuel Warren, in which they discussed the importance of the "principle of...an inviolate personality." ("The Right to Privacy," 4 Harvard Law Review 193 (1890)) Brandeis further championed this notion when, as a Supreme Court Justice, he stated,

> The makers of our Constitution recognized the significance of man's spiritual nature, of his feelings and of his intellect. They knew that only part of the pain, pleasure and satisfactions of life are to be found in material things. They sought to protect Americans in their beliefs, their thoughts, their emotions and their sensations. They conferred, as against the government, the right to be let alone - the most comprehensive of rights and the right most valued by civilized men. (Olmstead v. United States, 277 U.S. 438 (1928), dissenting opinion).

This "right to be let alone," i.e., the right of privacy, is not explicitly articulated in any of the provisions of our Constitution. Nonetheless, it is generally considered to emanate from the "penumbra" of several of the guarantees of the Bill of Rights, including: 1) the First Amendment right of association, 2) the Fourth Amendment right of persons to be secure against unreasonable searches and seizures, 3) the Fifth Amendment right against self-incrimination, 4) the Ninth Amendment, which protects rights not explicitly enumerated in the Constitution, and (5) the Fourteenth Amendment guarantees of liberty.

In recent years, the Supreme Court has employed the right of privacy to protect the right of individuals to be free from intrusion when making fundamental and personal decisions. It has been the Constitutional basis used to protect such private individual decisions as: the use of contraceptives (Griswold v. Conn., (1965); Eisenstadt v. Baird (1972); Carey v. Population Services (1977); the termination of pregnancy through abortion (Roe v. Wade (1973); Doe v. Bolton (1973); and the refusal of psychotropic medications by those confined in mental institutions (Mills v. Rogers (1982)).

Although the United States Supreme Court has not yet addressed the issue, several state courts have used the constitutional right of privacy to protect certain health care decisions made by patients. In 1976, the New Jersey Supreme Court was the first to explicitly apply the right of privacy in the context of medical decisions. In the Matter of Quinlan, the New Jersey court held that the right of privacy, "is broad enough to encompass a patient's decision to decline medical treatment under certain circumstances, in much the same way as it is broad enough to encompass a woman's decision to terminate pregnancy under certain conditions" (Quinlan, 1976). Thus, the court declared that a decision by a 21 year old non cognitive individual in a vegetative state, to terminate the breathing apparatus which was thought to be maintaining her life, was "a valuable incident of her right of privacy." The court appointed her father as her legal guardian with the express power to assert that right on her behalf.

One and one-half years later, the Supreme Court of Massachusetts concurred in this extension of the right of privacy to include the right to refuse life-sustaining treatment. In Superintendent of Belchertown v. Saikewicz, the Mass. Supreme Court asserted that the right of privacy "encompasses the right of a patient to preserve (him or herself)...against unwanted infringements of bodily integrity in appropriate circumstances." Since the Saikewicz case, several other courts have also permitted patients to refuse life-saving treatment as an exercise of their right of privacy. (See for example, In the Matter of Colyer, (WA, 1983)).

Neither the constitutional right of privacy nor the common law right to self-determination are absolute. Generally, several state interests have been found to potentially override these common law and constitutional rights(see discussion below). However, it is rare that any of these state interests are so compelling as to trump the patient's decision, and in most cases, these two rights stand firmly in support of the ability of patients to make personal health care decisions for themselves.

INFORMED CONSENT AND THE REFUSAL OF TREATMENT

A. THE DEVELOPMENT OF THE DOCTRINE OF INFORMED CONSENT

As described earlier, physicians had little obligation to disclose information in order to avoid liability for a battery. The tort law narrowly focused on the fact of a nonconsensual "touching" or intervention. Whether or not the patient truly understood what was being proposed, or even had enough information to consider the situation, was of little interest to the legal system. Even in the famous Schloendorff case, in which Justice Cardozo extolled the right of adults to control their own bodies, the court was not concerned about the information needed to exercise this control.

As a mechanism to mediate the relationship between physicians and patients, the battery theory was gross and insensitive. It did little to redress the imbalance of power created by medical training, medical institutions, social class and even the process of illness. With their only leverage being the ability to either give or withhold permission, patients, under the tort of battery, had little recourse in the face of their need for medical care. The common law right to self-determination was thus of little use to patients if physicians had no obligation to disclose information necessary for patients to thoughtfully exercise this right. This was particularly true as newly developed treatments and procedures not only presented more options and benefits, but were surrounded by greater risk and complexity as well.

In the late 1950's, the established duty of the physician to obtain consent was broadened to include the duty to disclose information. Merely obtaining the patient's consent would no longer satisfy the physician's obligation. Courts began to recognize that physicians should be bound by a certain standard of care. Included in this standard would be the obligation to disclose information which would enable patients to give or to withhold consent. If the physician obtained consent but failed to adequately inform, the theory of battery would not apply, but the physician could be liable for malpractice under the rubric of negligence. Negligence, as used in the law of torts, constitutes conduct that falls below the standard of care established by law. If the physician's negligence caused harm to the patient, then the physician would be liable.

The 1957 case, Salgo v. Leland Stanford Jr.

University Board of Trustees was the first to publicly use the phrase, "informed consent," but it was the landmark case of Natanson v. Kline (1960) which more fully articulated this expanded notion of a standard of care with regard to disclosure of information. The Natanson court, however, concerned about the creation of too onerous a burden on physicians, limited their duty to inform to "those disclosures which a reasonable medical practitioner would make under the same or similar conditions." This has become known as the "professional custom" standard and has been adopted by the majority of states which have legally recognized a recovery for lack of informed consent.

Criticism of the "professional custom" standard has focused on precisely the lack of custom in the medical profession to disclose information to patients before obtaining consent. The ancient Hippocratic admonition to physicians to "perform (duties) calmly, concealing most things from the patient while you are attending to him" still infuses medical education and practice Thus, there is little training for, or support of, physicians who choose to disclose critical information to their patients.

Two cases subsequent to Natanson addressed this criticism of the "professional custom" standard. In Canterbury v. Spence (1972), the court declared that

> (T)o bind the disclosure obligation to medical usage is to arrogate the decision of revelation to the physician alone. Respect for the patient's right of self-determination on particular therapy demands a standard set by law for physicians rather than one which physicians may or may not impose upon themselves.

The court in Canterbury outlined a standard of "materiality;" that is, the physician must disclose all information material to the patient's decision. This standard was proposed as an objective one, however, for materiality was to be judged not from the subjective perspective of any specific patient but rather from an objective perspective. The information should be material to "a reasonable person, in what the physician knows or should know to be the patient's position." This reasonable-patient "materiality" standard was also put forth in the 1972 case, Cobbs v. Grant. Since 1972, however, the trend in most states has been to adopt the "professional custom" standard rather than the materiality standard. This is due mainly to lobbying by professional medical organizations, who perceived the risk of liability for physicians to be too great under the materiality standard.

It is generally agreed that in order to fulfill his obligation to inform, the physician must at least disclose the diagnosis, the prognosis, the proposed treatment, alternative treatments, the risks and benefits of all options and the consequence of not intervening at all. There is, however, a generally recognized, though rarely warranted, exception to this duty to inform. This exception is known as the "therapeutic privilege." Under this exception, the physician is permitted to withhold information if, as a consequence of disclosure, the patient would likely experience direct and immediate harm or partake in self-destructive behavior. This decision to withhold information for therapeutic reasons is considered a medical judgment by the physician.

There is justifiable concern that the "therapeutic privilege" exception, if not stringently applied, could swallow up the general duty to inform. The court in Canterbury was keenly aware of this possibility.

> The privilege does not accept the paternalistic notion that the physician may remain silent simply because divulgence might prompt the patient to forego therapy the physician feels the patient really needs. That attitude...runs counter to the foundation principle that the patient should and ordinarily can make the choice for himself.

The withholding of information stands directly opposed to the intent of the informed consent process. Patients are denied the information necessary for the intelligent exercise of their right to consent or refuse. Therefore, information should only be withheld for therapeutic reasons "when the harm of its disclosure is both highly probable and seriously disproportionate to the affront to self-determination." (The President's Commission, MAKING HEALTH CARE DECISIONS).

B. THE PATIENT'S RIGHT TO REFUSE TREATMENT

Competent adult patients thus have a legally supported right to make health care decisions for themselves, and physicians have the concomitant obligation to provide the information necessary to exercise this right. Inherent in this patient-centered concept of decisionmaking is the permission for patients to make personal or even idiosyncratic decisions once they are supplied the requisite information. The particular subjective values and goals of the patient will obviously inform the patient's final choice. Informed consent accords the competent patient the ability to make a choice, and have it respected, even if the decision is "wrong," or one with which the physician does not agree, so long as it is a voluntary and informed decision.

The theory of informed consent, and the consequent case law and legislation which implement it, also support the right of the competent patient to refuse treatment, even if that refusal could lead to serious harm or death. Patients and physicians may have different values and goals in the context of health care decisions. If, after full disclosure by the physician, the patient weighs the risks and benefits of a proposed procedure against her own individual fears and hopes, and decides to refuse the intervention, then this is a decision which the physician should respect. The physician certainly should infuse the informed consent discussion with all of his professional expertise and experience, and provide his advice and opinion accordingly; the physician is not a neutral observer but rather a skilled advocate of his position. It is the patient, however,who is ultimately vested with the right to decide whether or not to undertake the treatment. All decisionally capable patients have this right to make a voluntary and informed refusal.

In order to give an informed consent or refusal, however, there are three necessary prerequisites: the choice must be informed, voluntary and arrived at by a person capable of making decisions. The previous discussion has already examined the need for the sharing of information. Voluntariness requires that the decision not be subject to coercion or fraudulent manipulation. Caregivers must be sensitive to such factors as institutional biases, the nature of the illness and the social and class distinctions between provider and patient, in order to guard against intimidating patients.

Finally, the patient must possess the requisite mental capacity to process the shared information and to make a voluntary health care decision. While most adult patients are either clearly capable or clearly incapable of making a decision, some patients, particularly the cognitively impaired or demented elderly, may have fluctuating or questionable capacity. There are no uniformly accepted criteria for determining capacity, although several distinct standards have appeared in both case law and bio-ethical literature (see discussion of "Comptency" below). There is general accord, however, that the capacity to make a decision should be assessed with specific regard to the choice to be made.

The decision to refuse treatment is a personal choice. Society, however, is not without some interest in these decisions. There are four societal interests which are, on rare occasions, considered to counterbalance and override the patient's rights to self-determination and privacy, which underlie the right to decline treatment. These societal interests are: 1) the preservation of life; 2) the prevention of suicide; 3) the maintenance of the ethical integrity of the medical profession; and 4) the protection of the interests of innocent third parties. These interests are most often raised in discussions of the right of surrogate decisionmakers to refuse treatment, although they sometimes stand as barriers to the decisions of capable patients, particularly Jehovah's Witnesses who refuse blood transfusions.

There are few situations in which any of these state interests is so compelling that it can override the patient's fundamental right to make decisions for herself. For example, although the preservation of life is certainly a weighty societal interest, it does not diminish the tremendous value given to individual autonomy and privacy. As one court has stated, "The value of life as so perceived is lessened not by a decision to refuse treatment, but by the failure to allow a competent human being the right of choice." (Saikewicz, 1978). In addition, the competent patient's decision to decline treatment, even life-sustaining treatment, is usually distinguishable from the self-destructive behavior that characterizes suicidal individuals. (cite most recent Bouvia decision).

In certain cases, there are cognizable third party interests in the patient's decision to decline treatment. Particularly when the patient has minor children who would suffer financially or emotionally from the patient's decision to refuse, or who would be abandoned because of the patient's decision to decline life-saving treatment, the state, in its _parens patriae_ role, may feel compelled to override the patient's health care decision. As a result, this societal interest tends to be a more critical factor when younger patients, who are parents, refuse treatment.

Finally, there is the issue of the ethical integrity of the medical profession when a patient declines treatment. Established case law and bio-ethical theory, however, explicitly articulate that the ethical integrity of caregivers does not demand that patients accept whatever physicians propose, particularly if the treatment would be futile, or if the patient values other qualities above the preservation of life. Indeed, as has been continuously stated, the prevailing ethical standards place a premium on the patient's right to bodily integrity and right of privacy.

The theories of patient self-determination and the right to refuse are of little value if they are not supported in the reality of medical practice. Indeed, the medical setting and the personalities of the parties involved may have as much, if not more, impact on the patient's ability to decline treatment than the dictates of any ethical theory or legal decision. For example, the obligations of informed consent are not fulfilled by merely handing the patient a pre-printed form ready for the patient's signature. The sharing and disclosure of information, so that the patient's consent or refusal is truly informed, is a process that requires time, patience and the ability to communicate on the part of the caregiver. However, the realities of modern medical practice, particularly in the acute care setting, may leave caregivers with little inclination or time to translate terms or explain processes. In fact, empirical studies have demonstrated that above all other reasons, patients refuse treatment because they have not been adequately or properly informed. (Meisel, Roth study). Unfortunately, the doctrine of informed consent is more often honored in the breach than in the observance.

The right to refuse treatment also requires courage and personal force on the part of the patient. These may be difficult qualities for a patient to summon forth, particularly an elderly patient whose voice is diminished, or who is combatting the dominance of setting and caregiver. For example, in a setting where a patient is truly dependent for all of his physical needs, as elderly patients may be in acute care or nursing home settings, there is little likelihood that the patient would risk the disapproval of, or rejection by, her caregivers by refusing treatment. Caregivers must attempt to mitigate institutional or individual biases, so that respect for patient decisionmaking is reflected nor merely in bio-ethical and legal theory but in clinical practice as well.

COMPETENCY - PATIENT DECISIONMAKING CAPACITY

There is a presumption in the law that all adults are "competent"- that is, all adults are considered to be able to exercise the full panoply of rights afforded to them upon reaching majority. This legal presumption of competence is a global one. It is a blanket protection which grants individuals the freedom to act in numerous spheres of life. The legal presumption of competency is rebuttable, however, and in reality, not all adults have sufficient abilities to make adequate decisions; many make foolish and self-destructive decisions. However, all adults are considered competent in the eyes of the law unless and until a court of appropriate jurisdiction declares them "incompetent." Unless there is a formal challenge to an individual's competency in a court this legal presumption, and all the attendant rights it affords, remains in effect.

When an individual is described as "competent" to make a health care decision, it is unlikely that this label is meant to evoke the global legal presumption just described. Much more likely, the term is used to categorize the individual as one with the requisite capacity to exercise his right to self-determination in the context of the specific health care decision to be made. This more focused use of the term "competent" really identifies the patient as one who possesses the "decisional capacity" to consent to or refuse the particular intervention proposed. Using the label "competent" in this more focused sense also provides the same sort of protection and empowerment that the legal sense of the word provides. For the competent patient is one whose ability to make decisions is not challenged and therefore whose decision is binding.

In the realities of modern medical practice, "competency" is a regularly used and familiar term. It is rarely necessary for anyone to explain that the term is being used in its more limited sense, rather than as the global legal presumption. For purposes of this chapter, however, it is important for the reader to be aware that adult patients can retain their legal presumption of competency while being clearly incapable of making a specific health care decision. Because of reader familiarity with the term competency, however, the word will be used interchangeably throughout the rest of this chapter with the phrase, "decisional capacity."

If patients are clearly capable, then their choices must be respected, provided their decision was informed and voluntary. For those patients clearly incapable (for example, the comatose patient or the patient afflicted with severe mental retardation or end stage dementia) decisions will have to be made by third parties on behalf of the patient (See discussion of "Proxy Decisionmaking," below). Especially among the elderly, however, there will be patients whose decisional capacity is not clear. Such patients may suffer from the early stages of multi-infarct or Alzheimer's Dementia, or they may have some other cognitive impairments which diminish their ability to make some choices but may not negate it for all purposes. Their competency may fluctuate: at certain times they may appear quite lucid, while at other times they may seem confused and disoriented. There is no firm agreement in either the bioethical literature or case law about methods for determining whether these patients of questionable or fluctuating capacity possess enough ability to determine the course of their care, even over caregiver objections.

As noted previously, the elderly may be particularly susceptible to certain characteristics of their illness, medication or environment that could compromise their capacity to make decisions. For example, medications may cause stronger metabolic reactions in the elderly than in other patient populations. Those who assess an elderly patient's competency need to be aware that a change in the type or dosage of medication could substantially affect the patient's mental abilities. Also, in strange, unfamiliar surroundings, where clothing and possessions are taken away (such as in the acute care environment), the elderly patient may become disoriented, as the items and environment that normally cue the appropriate responses are absent. Even the time of day may affect the elderly patient's decisional capacity. The phenomenon known as "sundowning," describes the diminished capacity that an elderly patient may experience as the day draws to a close, as light becomes less evident and vision becomes more difficult and distorted.

None of the above described factors necessarily negates an elderly patient's ability to make decisions for himself. The patient's capacity may fluctuate, but there is no reason that the patient cannot exercise decisional capacity during intervals of lucidity. Such fluctuations may require assessment of the patient's capacity to range over a period of time, rather than on a single visit in order to accurately reflect ability. In fact, experts Appelbaum and Roth ("Clinical Issues in the Assessment of Competency," 1981) suggest that, "Whenever the assessment of competency is being conducted in a nonemergency setting, more than one evaluation should take place...(there should be) a cautious approach to the evaluation of competency, represented by at least two contacts with the patient on at least two different days." The elderly patient may thus require the caregiver to spend more time than is typically necessary to assess competency, but the possible affront to a patient's autonomy, due to hasty and incorrect competency assessments, demands this extra time.

The need to assess a patient's capacity almost always arises in the context of a proposed diagnostic procedure or therapeutic intervention. There are no uniformly accepted procedures or criteria for determining competency. Who makes the assessment, and on what basis, is often affected by the setting in which consent is sought, the nature and risk of the proposed intervention and the particular characteristics of the individual patient. In the reality of medical practice, if a patient gives consent for a suggested procedure, there is very little likelihood that the patient's competency will be challenged, even if in fact the patient lacks the capacity to make an informed and voluntary decision. This is particularly true if involved family members also agree with the patient (MAKING HEALTH CARE DECISIONS, p. 61). Assuming the proposed intervention promotes the patient's objective well-being, it is in no one's interest to probe the patient's capacity and undermine the patient's presumed autonomy. There is a valid presumption that if the patient were "competent," he would choose the option that promotes his objective well being anyway. If there is no edivence to the contrary, then there is no reason to challenge this presumption.

Refusals of therapeutic or diagnostic procedures thus trigger most competency assessments. It is admittedly appropriate that caregivers confirm that the patient is capable of making the decision when the patient's choice differs from what is thought to be in the patient's best interest. This is not to say that because the patient chooses differently than the caregiver, the patient must be incompetent. It is merely to suggest that when a patient declines an intervention which would objectively be medically beneficial, it is prudent to make certain that the patient is accurately informed, acting voluntarily and is able, in some way, to reconcile her decision with her personal values and preferences.

The setting of the proposed intervention may often determine the procedures for assessing capacity. In the out-patient setting, where the patient could implement her refusal by walking out the door, there is probably little the caregiver can do to assess, or act upon his assessment of, the patient's capacity unless the patient is so blatantly compromised that the initiation of judicial competency or commitment proceedings would be appropriate (see discussion of "Proxy-Decisionmaking," below). In this setting, the caregiver has little recourse but to try to work with the patient to clarify the basis of the patient's refusal, and to try to allay any ill-founded anxieties or fears.

In the acute care or long term care environment, it is not so easy for the patient to "vote with her feet." In these settings, where the patient is more likely to constitute a "captive audience," the procedures used to determine decisionmaking capacity may involve more than the primary caregiver or attending physician. If a patient refuses a proposed intervention, it is likely, at least in the acute care setting, that assessment from a consultation liaison psychiatrist will be requested. Whether or not the psychiatrist has the final word on the patient's capacity to make the decision depends upon many factors, including the policies of the institution, its sensitivity to the rights of patients and even the strength of the patient's refusal.

Caregivers may also turn to family members or other available parties (such as clergy or close friends) for help in assessing the patient's capacity to make a decision. Those who know the patient best can help the caregiver determine whether the patient's articulated refusal is consistent with the preferences and values that she has developed over her lifetime. For example, is the patient's refusal to agree to a proposed amputation consistent with the importance she has previously given to such factors as personal appearance or the ability to walk independently? Perhaps the patient previously told her loved ones that she would never want to lose her leg, even if her life were in jeopardy. Knowledge of these previously expressed personal values, if used expertly by persons sensitive to prior expressions and directives would strengthen the force of the patient's refusal and should make it less likely that the patient's decision will be overridden. If the physician is aware that the patient is choosing in accord with previously articulated values, then there is little argument for the caregiver not to respect the patient's choice, even though she is in doubt about the patient's present capacity to make a decision. Labelling such a patient "competent" would permit the caregivers to respect her personal decision and it would be consistent with the "empowering" notion that underlies the concept of competency.

Finally, it is possible, though usually rare, for true competency assessments to be made outside of the confines of the acute care or long term care environment. On rare occasions, courts of law are presented with the question of whether or not the patient is "competent" to refuse treatment. Usually in the course of this action to the court, the petitioner will also be asking the court to appoint a legal guardian to make the decision for the patient (presumably in favor of accepting the proposed treatment), should the court declare the patient "incompetent."

If the competency assessment is presented to a court, it is likely that the court will strongly rely upon the opinions of the patient's caregivers, and the assessment of the consultation liaison psychiatrist (if there is one), as well as any testimony from family and even the patient herself. Judicial decisions often reflect the idiosyncrasies of the specific case. This type of judicial determination of decisional capacity, however, does not necessarily equate to a formal decision on the patient's legal status as a competent adult (see section "COMPETENCY - DECISIONMAKING CAPACITY" supra). An individual may be considered legally competent, and therefore retain all of the attendant rights, such as the right to vote, make a contract or write a will, but still be declared incapable of making the specific decision in question. The converse may also be tru: a guardian may be appointed to manage all aspects of the patient's life, even though only one type of ability was in question.

Recourse to a court of law in order to determine decisional capacity is not routine, nor should it be (MAKING HEALTH CARE DECISIONS,p. 175). There is a natural disinclination among caregivers and families to seek court resolution on questions of capacity. Bringing these determinations to court is an expensive and often time consuming process. Although it is possible, in cases of emergency, to get quick judicial resolutions, in the ordinary situation, the wheels of justice grind very slowly. State court systems are already overwhelmed and backlogged. In practical terms, this may preclude the option of a judicial determination altogether. Moreover, the public nature of judicial hearings may be exploitive and invasive in the context of these private, personal decisions.

There is also no evidence that the judges have a better analytic ability or ethical framework on which to decide these cases than those individuals who work in health care institutions. Judges have little experience with these types of cases, and, by and large, rest their decisions on the recommendations of the institution's experts. Little may be gained by bringing these determinations to court. Finally, there is the risk that once the assessment of decisional capacity is brought to the judicial forum, a judge may take it upon himself to rule on the patient's _legal_ status as a competent adult. Not only could the patient be disempowered in the context of the specific health care decision, but as well she could lose all of the fundamental rights that accompany that legal presumption.

The foregoing discussion is not meant to imply that it is never appropriate to ask courts to decide upon a patient's decisional capacity. There may be patients whose refusal is so mute or vulnerable that caregivers require a judicial declaration before they are comfortable in accepting the patient's articulated decision. Courts are the appropriate forums for the determination, and protection, of individual rights. The question of a patient's capacity can, however, be decided in the setting of the health care institution, in most cases, if caregivers are sensitive to institutional or provider biases that may affect the decision. These are difficult and troubling decisions, however. Some institutions even utilize institutional ethics committees to help with the assessment in particularly difficult or controversial cases (see discussion of "Ethics Committees," below).

Substantive Criteria for Determining Competency

There are few public judicial pronouncements on the substantive criteria for assessing decisional capacity. This may be attributed to several factors. First, as previously noted, judicial determination of decisional capacity in the context of health care decisions is rare. Therefore, courts have had few opportunities to consider the issue. In addition, those courts which have ruled in cases involving competency and medical decisionmaking have, for the most part, been presented with patients whose decisionmaking incapacity is clear. In those cases, the adjudication has focused not on the ability of the patient to make the decision, but rather on the ability of another, third party to make decisions on behalf of the patient.

Nonetheless, two state courts of appeals have publicly discussed the requisite capacity necessary for a patient to decline a proposed intervention. In the case of Lane v. Candura (Mass., 1978), the court held that Mrs. Candura, a 77 year old widow who initially vacillated, and ultimately refused to give permission to caregivers to amputate her gangrenous leg, had "the legally requisite competence of mind and will to make the choice for herself." The court recognized that Mrs. Candura was "lucid on some matters and confused on others." The focus of the court's inquiry, however, was whether Mrs. Candura made a choice "with full appreciation of the consequences." With that perspective, the court found Mrs. Candura competent to make her "most unfortunate" but "not...uninformed decision." The court stated:

> Senile symptoms, in the abstract, may, of course, justify a finding of incompetence, but the inquiry must be more particular. What is lacking in this case is evidence that Mrs. Candura's areas of forgetfulness and confusion cause, or relate in any way to, impairment of her ability to understand that in rejecting the amputation she is, in effect, choosing death over life.

The Candura court cited for support two earlier cases, In the Matter of Quackenbush (NJ, 1978) and In re Yetter (PA, 1973), cases in which patients with fluctuating lucidity were also declared capable of refusing life-sustaining surgery. For the Candura court, the key factor in determining decisional capacity was the patient's capability of "appreciating the nature and consequences of..(the)..act."

This focus on the patient's ability to appreciate and understand the nature and consequences of the act was also important to the court in State Dept. of Human Services v. Northern (Tenn., 1978). Mary Northern was a 72 year old patient with two ganrenous feet who refused permission for both feet to be amputated. She was considered to be generally lucid and of sound mind. On the one issue of her rotting feet, however, Mrs. Northern would not recognize the seriousness of her condition or the possibility that her death might be a consequence of her refusal of surgery. In fact, the court stated, "she evinces a strong desire to live and an equally strong desire to keep her dead feet."

For the Northern court, it was this inability to publicly give evidence of "a comprehension of the facts of her condition," that led the court to hold Mary Northern incapable of making the decision. The court stated,

> Capacity means mental ability to make a rational decision, which includes the ability to perceive, appreciate all relevant facts...on the subjects of death and amputation of her feet, her comprehension is blocked, blinded or dimmed to the extent she is incapable of recognizing facts which would be obvious to a person of normal perception.

Thus, the courts in both of these state cases have chosen to emphasize the patient's ability to comprehend and appreciate both the situation and the consequences of the patient's choice, when determining whether the patient has the requisite capacity to refuse life-prolonging treatment.

Commentators in both the legal and bioethical literature have also proposed various substantive standards for determining decisional capacity. There is general agreement that the goal of the standard is to construct a test which "best balances the rights of autonomy and protection." (B. Freedman, "Competence, Marginal and Otherwise, 1981). Yet these authorities differ in the language and stringency by which they measure competency.

In its seminal work, "Making Health Care Decisions," the President's Commission stated that decisionmaking capacity requires, to some degree, all of the following elements: (1) possession of a set of values and goals; (2) the ability to communicate and to understand information; and (3) the ability to reason and deliberate about one's choices. These criteria require a fairly sophisticated level of patient functioning, and are much more comprehensive than the criteria utilized by courts. It should be noted that the Commission specifically dismissed the use of tests which either look at the outcome of the patient's choice, or at the patient's status (age), in order to determine competency.

Roth, Meisel and Lidz ("Test of Competency to Consent to Treatment," 1977) described five various tests of decisional capacity, which become more stringent in order of appearance: (1) the ability of the patient to evidence a choice, that is, the mere presence or absence of ability to make a choice; (2) whether the outcome of the patient's choice is reasonable, i.e., would a reasonable person in like circumstances make that decision; (3) whether the patient's choice is based on "rational" reasons - this test looks at the quality of the patient's thinking; (4) whether the patient has the ability to understand the risks, benefits and alternatives to treatment; how the patient weighs or values these elements is unimportant; (5) whether the patient has actually understood the information about the treatment that she was provided.

The philosopher James Drane ("The Many Faces of Competency," Hastings Center Report, 1985) has put forth a "sliding scale" model to assess competency. Under this theory, there is no one single standard that can apply in all cases of determining capacity to consent to or to refuse treatment. Instead, Drane divides the types of medical decisions into three categories; those that are low risk, and objectively in the patient's best interest; those of more moderate risk or less certain benefit to the patient; and those in which diagnostic uncertainty is minimal, available treatment is effective and the result of a refusal is likley to be death. With each standard, Drane requires an increasing level of sophistication. For the first set of interventions, the patient need only be aware of the general situation. For the next level, the patient must be able to understand the risks and options, and then be able to choose based on that understanding. Finally, in the most serious situations, the patient must have the capacity to appreciate the nature and consequences of this decision. Under this "sliding scale" standard, then, as the risks from refusing grow larger, so, too, does the stringency through which patients' refusals are screened.

Benjamin Freedman proposes only one standard, but it is quite a sophisticated one. Under his model to assess competency, the patient must be able to use the information which was provided during the informed consent process to formulate what he calls "recognizable reasons" to support the choice she makes. That is, the patient must articulate the premises on which her decision is based, and her choice or conclusion must be related to these premises, although the premises need not be strong enough to justify the conclusion.

All of the above proposed tests tie the assessment of competency to the specific decision to be made. One noteworthy exception, however, is the standard put forth by Virginia Abernathy. Her test, based on her analysis of the Mary Northern case (see discussion above) is quite distinct. What Abernathy proposes is that competency should not be assessed in the emotionally charged atmosphere of a specific situation, which she claims can put too much emphasis on the outcome of the patient's choice. Instead, Abernathy proposes that, "A patient who was informable and cognitively capable of making ordinary decisions on matters unrelated to the crisis at hand would be held competent to refuse or accept medical interventions." ("Compassion, Control and Decisions About Competency," 1984). This model departs from the general consensus that decisional capacity is directly related to the specific decision to be made.

It is not the intent of this description to provide a detailed critique of each of the proposed models, or to try to synthesize all of these tests into one, understandable, easily applied standard. Rather, the existence of this variety of tests among courts and commentators merely highlights the fact that determinations of capacity, while at times requiring just a common sense analysis, do, at the same time, reflect conflicting societal judgements about when patients should be given the freedom to decide as they please, and when protection, more than autonomy, is the primary goal.

THE ELDERLY PATIENT CAPABLE OF MAKING DECISIONS: THE EXERCISE OF RIGHTS IN CONTEXT

Those elderly who are clearly capable of making decisions, or who have been assessed to be capable, by whatever standard employed, have the same rights as all other adult patients in the context of making health care decisions. Their age in no way diminishes the recognition and respect that caregivers owe to all competent patients who face a proposed medical intervention. The competent elderly patient has the right to be informed about her diagnosis, the proposed intervention, the risks of that intervention, the availability of other options and their risks, and the consequences of not intervening at all. After receiving this information, the competent elderly patient can either give consent, or refuse the intervention, even if that refusal should lead to serious harm or even death for the patient. Supported by the common law right to self-determination and the constitutional right of privacy, competent elderly patients are empowered to decide however they wish.

In the context of different settings, however, elderly patients may experience different degrees of difficulty in trying to exercise these rights. For instance, in the ambulatory care setting, where the patient receives medical attention in the physician's office, patients may be in a better position to demand more from their providers. The setting may be less intimidating than an institutional setting, and there may be more equilibrium in the relationship between patient and physician. For example, the ambulatory patient may be in better health than the in-patient or institutionalized patient, and thus may overall be functioning better. The encounter between patient and physician can be scheduled at a time that the patient chooses, rather than at arbitrary times when the physician stops by the patient's room. Finally, if the ambulatory patient is dissatisfied with the provider, or the information and options presented, the patient can simply walk out of the office and obtain the advice and services of another provider.

This apparent ease for the elderly patient in the ambulatory care setting is deceptive, however. In particular, it may not be quite so easy for the elderly patient to "shop around" for the most accommodating and respectful caregiver. Many elderly exist on fixed or low incomes. If a caregiver does not accept Medicaid, or requires the patient to pay a premium above the Medicare reimbursement rate, then that physician is, in effect, unavailable for a large percentage of elderly patients. Moreover, although living in the community, many elderly patients cannot easily travel from one caregiver to another. They may depend upon whomever is accessible in their immediate community. This may, as well, foreclose the option of "shopping around" for alternative providers.

There are no published judicial decisions which discuss the rights of the elderly patient in the outpatient, ambulatory care setting. There is, however, every reason to assume that the competent patient's right to make informed, voluntary decisions applies in this setting, and that this right could be judicially vindicated if necessary.

The In-Patient Acute Care Setting

Acute care hospitals are often overwhelming and intimidating institutions. They tend to be large, complicated and depersonalized. There is an attendant loss of privacy and self for all patients. Generally, patients do not wear their own clothes nor are they surrounded by objects that bring familiarity or comfort. Their visitors are restricted, and their telephone calls are limited. Patients are continually subject to a barrage of providers and procedures, many of which do not even require the patient's consent. (This is particularly true with the administration of medications.) Overall, the patient has little influence or control over the daily course of events in the acute care institution.

The primary goal of acute care hospitals is the diagnosis and remedy of acute medical episodes, so that patients can return to their baseline functioning. There is a strong institutional bias and commitment toward effectuating a "cure" or toward preserving life, and sophisticated equipment and procedures are readily available to achieve these goals. The patient who declines these interventions, or refuses life saving or sustaining remedies, stands directly opposed to these institutional commitments. As the President's Commission noted,

> For a patient to decline procedures needed to make a definitive diagnosis, to reject vigorous treatment that might possibly bring longer life, or to find meaning in death and suffering is not only seen by most hospital personnel as aberrant or even suspect behavior, but may actually be very disruptive of the usual institutional routines and assumptions. ("Deciding to Forego Life-Sustaining Treatment," p. 107)

In the face of these institutional forces, patients, particularly elderly patients, may be discouraged from asserting their rights. Particularly with the new prospective payment reimbursement schemas, the acute care environment may not be supportive of the elderly patient who requires a more time-consuming explanation, or who needs to weigh available options in his own time and manner. The economic forces that drive modern acute care hospitals may thus diminish the rights and protections afforded to competent patients.

Several state supreme courts, however, have affirmed the right of competent, hospitalized elderly patients to decline proposed interventions and to exercise their right to make health care decisions for themselves. These rights have even been upheld in the Federal District Court in Washington, D.C., for patients hospitalized in military hospitals (Tune v. Walter Reed Army Medical Hospital, Civil Action No. 85-0697, 1985).

In Satz v. Perlmutter (Florida, 1980), the state appeals court affirmed a trial court order which permitted a competent, terminally ill, hospitalized patient to be removed from the respirator which sustained his breathing. The court stated, "We find, and agree with, several cases upholding the right of a competent adult patient to refuse treatment for himself. From this agreement, we reach our conclusion that, because Abe Perlmutter has a right to refuse treatment in the first instance, he has a concomitant right to discontinue it."

A more recent, and perhaps stronger case upholding the rights of competent, elderly patients in the acute care environment, is the case of Bartling v. Glendale Adventist Medical Center (CA, 1984). Mr. Bartling was a 70 year old gentleman who suffered from five major medical problems, none of which was imminently life-threatening. During a hospitalization for depression, a routine chest x-ray showed a tumor on his lung. Mr. Bartling agreed to a biopsy, during the course of which his lung collapsed. Mr. Bartling was placed on a ventilator, and efforts to wean him from it were unsuccessful.

When both Mr. and Mrs. Bartling requested that the ventilator be removed, the hospital refused to comply, and in fact, placed Mr. Bartling in "soft restraints" to prevent him from disconnecting the ventilator tubes. Mr. Bartling petitioned the court: he sought damages and asked for an order to restrain the hospital from administering any unconsented to medical care. The hospital, a religiously affiliated acute care institution, countered that it was devoted to the preservation of life, and that it would be unethical for hospital physicians "to disconnect life-support systems from patients whom they viewed as having the potential for cognitive, sapient life."

The appeals court first recognized that Mr. Bartling was competent to decide whether to have the ventilator disconnected. They found that he "knew he would die if the ventilator were disconnected but nevertheless preferred death to life sustained by mechanical means." In a clear statement of the right of competetent hospitalized patients, the court also stated

> If the right of the patient to self-determination as to his own medical treatment is to have any meaning at all, it must be paramount to the interests of the patient's hospital and doctors. The right of a competent adult patient to refuse medical treatment is a constitutionally guaranteed right which must not be abridged. (emphasis added)

In most instances, the goal of maintaining or preserving life is a laudable one for acute care institutions. That is, in fact, part of their justification for existence. However, all of their technological empowerment and institutional biases cannot be permitted to negate the competent, elderly patient's right to choose whatever course she wishes. If the patient refuses the proposed intervention, and there are no other medical or palliative offerings available for the patient, then perhaps the patient no longer requires the acute care services of a hospital, although that setting may be the only one able to provide adequate comfort, care and support. But patients do not leave their rights at the door when they enter acute care institutions. Hospitals cannot force treatment on competent, unconsenting hospitalized elderly patients.

The Long Term Care Setting

Over 80% of long term care residents are over 75 years of age. (Deciding to Forego...p. 108), and __% are without living or involved family. With those statistics, one might expect that such facilities would be sensitive to, and protective of, the rights of elderly individuals. However, despite licensing and accreditation procedures and the guidelines put forth by various organizations and a Bill of Rights, the quality of care and the respect given to residents, varies greatly among individual institutions.

For certain elderly individuals, entering a nursing home can represent a positive transition; it can provide a chance to live in a supportive environment and to interact with other individuals. However, for many individuals, entering a long term care facility represents a relinquishment of hope. Once admitted, very few people leave nursing homes. There is even a phenomenon known as "transfer trauma," which describes the increased risk of morbidity for elderly individuals who reluctantly or unwillingly enter a long term care facility. With such an aura of resignation and defeat, it is not hard to understand how an elderly and alone resident would choose not to fight aggressively for the exercise and protection of her rights. It is possible the individual would not even be cognizant about her rights as a nursing home resident, the patient Bill of Rights notwithstanding.

Residents in nursing homes are often chronically ill and dependent. Even if a resident has the full capacity to make decisions, the environments of many facilities engender extreme dependence and loss of control. Despite this, there is neither theory nor argument to distinguish the decisionally capable resident from other capable elderly. They possess the right to choose individually appropriate healthcare. Indeed, because of the number of elderly residents, and the inevitability of their morbidity, it could be argued that long term care facility caregivers and administrators have an affirmative obligation to support and encourage the exercise of rights. One suggested approach might be to document personal preference regarding health care interventions as part of the facility's admission process.

There is one known (but unpublished) judicial opinion that discusses the right of the competent nursing home resident to refuse care. In Matter of Plaza Health and Rehabilitation Center (NY Supreme Court, 1984), the court stated that the resident, an 85 year old man, was competent at the time he began to refuse to eat ("he knowingly and willingly made that decision with the full understanding of the consequences, a hastened death") and therefore, the facility was neither required nor permitted to hospitalize the resident, in order to surgically force feed him. The judge stated, "I will not, against his wishes, in effect order this 85 or 86 year old person to be operated upon and/or to be force fed in any manner, or to be restrained for the rest of his natural life." Although the judge did not explicitly state on what basis he made this decision, it is clear that this opinion is supported by the resident's common law right to self-determination.

Elderly nursing home residents who possess the capacity to make decisions should not be treated differently because of their age or place of residence. As with all other competent adults, they have the right to be informed, and the right to voluntarily give or withhold consent, before any medical intervention is begun.

THE ELDERLY PATIENT NOT CAPABLE OF MAKING DECISIONS: THE EXERCISE OF RIGHTS IN CONTEXT

For those patients who are clearly incapable of making decisions, or assessed to be incapable of addressing the particular decision to be made, some other third party must make the health care decision on behalf of the patient, even if that decision is to continue care already begun. The questions to be addressed are as follows: (1) Can treatment ever be refused on behalf of an incompetent patient? (2) If so, who is empowered to make that decision? and (3) What are the criteria that would guide a third party making a decision on behalf of such a patient?

Incompetent patients are not without rights with regard to medical decisionmaking. The common law right to self - determination, and the constitutional right of privacy survive the incapacity of the individual. Courts that have considered treatment decisions for incompetent patients have begun their analyses with the premise that the rights accorded to these patients are the same as for those capable of deciding. For example, in the Saikewicz case, which involved possible chemotherapy for a 68 year old congenitally retarded man, the court explicitly stated, "The substantive rights of the competent and the incompetent person are the same in regard to the right to decline potentially life-prolonging treatment...The recognition of that right must extend to the case of an incompetent, as well as a competent, patient because the value of human dignity extends to both."

Since courts have recognized the uniform applicability of the fundamental rights which protect and empower patients, the challenge has been to develop procedural and substantive criteria that protect the integrity of individual decisions, protect vulnerable classes and shield society from decisions for which no agreed upon norms exist. There are no uniform legal rules with regard to surrogate decisionmaking. Guidelines have been developed in cases, bioethical commentaries, and state legislation. The legislation has particularly focused on the appointment of proxy decisionmakers and procedures for documenting patient preference before incompetency sets in. There have been distinct variations in the policies put forth, and no one description will cover every jurisdiction. It is, however, possible to highlight the major judicial opinions, and the factors which appear to distinguish them.

The Setting

There are no published empirical data nor even anecdotal information on decisionmaking for the incompetent adult patient who lives in the community. Although surrogate decisions to withhold or withdraw treatment from patients living at home must arise, they exist out of public scrutiny. Moreover, since approximately 60-70% of all Americans die in acute care hospitals, and another 15% die in long term care facilities ("Deciding to Forego," p. 106), it is reasonable to surmise that decisions about life-sustaining treatment for decisionally incapable elderly individuals infrequently arise in the home setting. The elderly who are that ill are more likely to be in either an acute care, or long term care, facility. When such treatment decisions do arise in the home setting, they are likely to be private decisions made by those who care for these incompetent adults, with or without the consultation of their physicians.

Most decisions to withhold or withdraw treatment from incompetent eldery patients arise within the confines of either acute care hospitals or institutional facilities (including long term care facilities and psychiatric institutions). In many cases, residents of institutions are transferred to acute care hospitals, where issues regarding the appropiateness of life-sustaining treatment will be resolved.

Courts that have considered these treatment decisions have generally made no effort to limit their decisions to specific settings. A notable exception was the New Jersey Supreme Court case, Matter of Claire Conroy (1985) which held to apply only to nursing home residents (see discussion of Conroy, below). Scholars, therefore, have generally not categorized these cases on the basis of the setting of the decision. The institutional biases and interests of acute care hospitals and long term care facilities (as discussed, *supra*) should not be overlooked, however. They may affect the ability of third parties to make decisions on behalf of incompetent elderly individuals in the same way they affect the competent patient's right to make decisions for herself.

PROXY DECISIONMAKING FOR INCOMPETENT PATIENTS: THE PROCEDURES FOR APPOINTING SURROGATES

Patients who are not capable of making decisions require others to decide for them. These third parties are commonly known as a "proxy" or "surrogate" decisionmakers. Who that third party is depends on several factors, including: the directions, if any, left by the patient before she became incompetent; the availability of family or close friends of the patient; the consensus or controversy that surround the decision to be made; and, the case law and statutes of the jurisdiction.

1. THE PATIENT APPOINTED PROXY DECISIONMAKER

In many jurisdictions, adults have the legally authorized ability to appoint, in advance of incompetency, a third party to act as their proxy decisionmaker. Depending upon the state, this can either be done through a durable power of attorney or in the context of a living will (see discussion below). In this way, should the individual subsequently be incapable of making health care decisions, an available and recognized surrogate will be empowered. This advance appointment obviously has several preconditions: the patient must have previously been competent, must have thought about the need to appoint a proxy in advance, and must have had some third party available who was willing to take on that role. For elderly individuals who are all alone in the world, this advance appointment of a proxy is obviously not feasible.

For those elderly individuals who do have an available surrogate, appointing this person in advance can avoid or minimize subsequent confusion, can clarify possible ethical dilemmas and may even prevent pain and suffering. Selecting a proxy in advance allows the patient to ensure that someone trustworthy and knowledgeable will be acting on the patient's behalf if she can no longer make decisions. It will also encourage the elderly individual to consider and discuss her values and preferences with regard to health care decisions, so that when decisions must be made for her, those decisions will mirror what she would have chosen, were she able to choose.

There are, in general, two legally recognized routes for the advance appointment of proxy decisionmakers. First, eight states [1] have "Living Will" statutes (see discussion, below), that specifically provide for the appointment of a proxy decisionmaker in the context of filling out a living will document. (Physician and the Hopelessly Ill Patient, 1985). Depending upon the specific state statute, proxies appointed through this method can serve several functions: (1) they can serve as a competent advocate for the explicitly documented preferences of the patient; (2) they can fill in gaps or clear up confusion based on the prior directives communicated by the patient; or (3) they can make decisions when no prior, explicit directives have been left at all. The legal authority of proxies who are appointed by this method, in states where living will documents have not been recognized by statute, is uncertain. There is, however, general recognition that even without a living will statute, an individual, while competent, can document explicit future directives and that respect should be given to these directives once the patient is no longer capable of making decisions.

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[1] Delaware, Florida, Indiana, Iowa, Louisiania, Virginia, Utah, and Wyoming

The other method through which proxy decisionmakers can be appointed by the competent patient in advance, is through state "Durable Power of Attorney" statutes. Every state (except the District of Columbia) has such a statute. These statutes permit individuals (known as "principals") to delegate to another (known as the "proxy," "agent," or "attorney in fact") the legal authority to act on the principal's behalf. Such empowerment is "durable" because it survives, or continues, even if the principal subsequently becomes incompetent (although it ends at the death of the principal or agent). These statutes were originally drafted to permit financial or property transactions in the absence of the principal. Their applicability in the context of health care decisions is uncertain, although three states (California, Colorado and Pennsylvania) either expressly or implicitly allow this use.

2. Court Appointed Proxy Decisionmakers

Under their *parens patriae* powers, states have the authority and obligation to protect individuals who are incapable of protecting their own interests. This empowerment, which is derived from English common law, grants courts of law the authority to appoint legal guardians, both for children (who are categorically considered unable to protect themselves) and for "incompetent" adults (some states require that the adult first be adjudicated "legally incompetent" before a general guardian will be appointed; other states recognize that adults can be "incompetent" or functionally incapacitated in only certain spheres, and will therefore appoint guardians for limited purposes). These appointment proceedings are alternatively known as guardianship, conservatorship or committeeship proceedings, depending upon the state statutes.

Resort to a court of law for the appointment of a legal guardian to make health care decisions on behalf of an incompetent patient is not typical. It is, however, most likely to occur when either: 1) the incapacitated patient has no family or close friends; (2) the treatment plan is considered controversial, and caregivers and family want judicial guidance and assurance about the appropriateness of their actions; (3) the patient has left no explicit directives for caregivers to follow; or (4) caregivers and family or close friends disagree on the action to be taken on behalf of the patient. Courts are willing to appoint legal guardians for the specific purpose of making health care decisions; some of the most noteworthy state judicial decisions about the rights of incompetent patients have arisen in this context (including the *Quinlan* case (NJ, 1975)).

During judicial hearings for the appointment of a legal guardian for incompetent patients, courts will usually appoint someone to serve as the incompetent's "guardian ad litem." The guardian ad litem investigates the situation and makes a recommendation to the court with regard to the appropriateness of appointing a legal guardian. It should be noted that in many state statutes, there is a recognized preference for appointing a family member to be the incompetent's legal guardian. It is not clear, however, whether guardians already appointed for general management tasks have the authority to make specific health care decisions for their wards.

3. The Informal Designation of Proxy Decisionmakers

In the realities of everyday health care delivery, not every incompetent patient has a court appointed guardian, or a surrogate whom he explicitly appointed before he became incompetent. The ordinary practice in acute care hospitals, and other health care institutions, is for caregivers to turn to next of kin or other close family or friends who appear to know the patient and have the patient's best interests in mind. Oftentimes, a particular family member will step forward and present herself to the caregiver as the family spokesperson. At other times, the caregiver may have to use her judgment to decide who among those present is best able to assist with the decisionmaking for the incompetent patient. If the caregiver cannot select someone, or if several family members disagree, for example, the caregiver may be forced to petition a court for a legal guardian.

In most states, there is no clear legal authority for family members to make decisions on behalf of their elderly relatives, although it is a common and widely accepted tradition. In general, family members are not, merely because of their relationship, legally empowered to act on behalf of their loved ones. Five states,[2] however, in the contexts of judicial opinions, have recognized this common practice as a means of exercising the incompetent patient's common law or constitutional rights (Physician and the Hopelessly Ill Patient, 1985). The assumptions which underlie this tradition of informally-designated family surrogates include, (1) the belief that the family is the most concerned about the patient's "best interests," and (2) the belief that the family is the most knowledgeable about the patient's values and preferences. If there is evidence to contradict either of these beliefs, then the physician is best advised to seek out legal counsel, and perhaps petition a court for appointment of a legal guardian.

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[2] **California, Connecticut, Florida, Georgia and New Jersey**

THE SUBSTANTIVE BASIS FOR THE SURROGATE DECISION

By whatever method selected, the surrogate must possess the following qualities: (1) she should have no conflict of interest with the incompetent patient; (2) she should have the capacity to participate in the decisionmaking process in an informed and conscientious manner (with the necessary corollary that the patient's caregiver must provide the appropriate information); and (3) she should have the ability to advocate the incompetent patient's interests, and to maintain control throughout the decisionmaking process. (Capron, "Authority of Others to Decide About Biomedical Interventions with Incompetents," in WHO SPEAKS FOR THE CHILD, 1982).

As stated earlier, there are two primary values in medical decisionmaking: (1) to promote the patient's well being, and (2) to respect the patient's right to self-determination. On his own, the incompetent patient is unable to promote either of these. It is up to the surrogate to make decisions on behalf of the incompetent patient, in a manner consistent with the promotion of these values.

There are two legal standards which generally guide proxy decisionmaking : the "substituted judgement" standard, and the "best interest" standard. Each standard guides decisionmaking from a different perspective. The substituted judgement standard requires the surrogate to look to personal values and preferences of the patient when the surrogate makes health care decisions. It is a subjective standard that necessitates that the patient at one time must have been competent, and must have expressed, in some manner, values and preferences that are relevant to the decision to be made. If the patient left no directives, failed to convey any prefernces to anyone, or was never competent at all, then the surrogate must rely on the "best interest" standard for guidance. This standard focuses on more objective, societally shared criteria. The surrogate makes the decision from the point of view of the "reasonable person," and considers such factors as the relief of suffering, the usefulness or futility of the proposed intervention for the patient, (that is, is the treatment medically indicated), and the risks, benefits, and the burdens of the proposed intervention to the patient. Most scholars agree that benefits and burdens to family and society are irrelevant to the decision.

Under the substituted judgment standard, the surrogate's decision should be the same decision that the patient would have made, were she able to do so. As the court in the Saikewicz case stated, this standard requires the surrogate to "don the mental mantle of the incompetent." (What is interesting to note is that the Saikewicz court used this standard despite the fact that Mr. Saikewicz, a 67 year old congenitally retarded man, had never been competent to make this, or any other, decision.) The President's Commission recommended substituted judgment as the preferred standard, because it allows the patient's own definition of "well-being" to be in control, and thus, in a certain way, permits the incompetent patient to exercise her right to self-determination, although she in fact is unable to do so.

There are, in general, two types of substituted judgment cases: (1) those in which the patient made her wishes and preferences explicitly clear, through documentation or discussion prior to becoming incompetent; and (2) those in which the patient left no explicit statements, but because of a close familiarity with the patient, her lifestyle and patterns of behavior, the surrogate is able to infer what the patient would have wanted regarding the specific decision to be made. Some states, (notably New York) require an explicit statement of the previously competent person, which is supported by "clear and convincing" evidence (Matter of Storar, In the Matter of Phillip Eichner, 1981). No inferences are permitted in those jurisdictions. Other states, such as Massachusetts, not only permit inferences, but they also extend the use of what they consider the "substituted judgment" standard to situations where the patient was never competent.

The most effective way for a patient to ensure that her surrogate will respect her values and preferences, should she some day be incapable of making decisions for herself, is through the use of an "advance directive." This is a generic term that refers to several sorts of instruments which can be executed by the patient before incompetency intervenes. Such instruments include living wills, durable powers of attorney, and specific state documents created by statute. In some circumstances an open and frank discussion with a physician, which is documented in a chart, may serve a similar purpose. However, this private and confidential notation can only be invoked by one person - it has no public existence, as do living wills and durable powers of attorney.

In the area of advance directives, the living will has perhaps been the most promoted method for documenting patient preferences and desires. When such documents were originally developed, they had no legal sanctioning. Because they enunciated the specific preferences of the patient, however, they were considered morally persuasive and were consistent with the concept that the right to self-determination and the right of privacy extend to the incompetent patient as well. The need for such documents became clear, as medical technology was able to extend "life" beyond what many individuals considered a life worth living for themselves. However, early drafts of the document were criticized because their language was non-specific, terms were not adequately explained and thus surrogate and physician were left with substantial ability to interpret the documents however they wished.

In an attempt to give living wills more binding legal effect, and to standardize language, meaning and usage, many states began to enact legislation which established formal requirements for a living will, and permitted its use in certain prescribed situations. California was the first state to enact such legislation, and the name for its statute, the "Natural Death Act," has become the generic label for many state statutes which legally authorize such advance directives. Since 1976, 36 living will laws have been enacted.

There is no real uniformity among the various state living will laws, which raises questions about the effectiveness of the document in a state other than the one in which it was executed. In general, however, these statutes tend to limit the authorized availability of the living will to certain, often narrowly defined, cases. For example, the statutes are generally restricted to use only by the "terminally ill," a term not often defined. This precludes the use of the documents for a large percentage of elderly who, although not critically or terminally ill, may nevertheless suffer from painful acute or chronic illnesses. Many of the statutes also employ such vague language as "extraordinary" or "artificial" treatment, without adequate definition. Few of the statutes provide for any punishment or fines for caregivers who fail to respect the terms of the document. In those states, physicians may disregard the living will with impunity.

Nonetheless, these state statutes have provided legitimacy for the idea of advance directives. They outline substance and procedure for patients, surrogates and physicians to follow, so that parties can act with some legal and moral comfort, and so that caregivers are more likely to respect the wishes of a previously capable patient. Even the process of debating and enacting such legislation raises the public conscience, and encourages more individuals to consider and document their preferences in advance of incapacity. There is widespread recognition that although these state statutes have flaws, they have provided the impetus for further discussion and more sophisticated legislation. In fact, in response to the vagaries of the present statutes, both the National Conference of Commissioners on Uniform State Laws, and the Legal Advisers of Concern for Dying (a New York-based educational council, devoted to the promotion of living wills) have each proposed model legislation which addresses many of the problems of the current statutes.

There are, however, many patients who, for various reasons, have failed to make their preferences known. For many individuals, consideration of a future period when they might not be capable of making decisions for themselves is troubling. An element of denial, or unwillingness to consider mortality, may prevent an individual from anticipating, and planning for, future incapacity. In addition, for those elderly who are alone or without family, there may be no one available with whom such discussions can be held. Although this would not prevent an individual from documenting her preferences, many elderly may be simply unaware of the need to do so or, if aware, unable to secure assistance.

Despite the lack of an explicit prior statement, many jurisdictions are willing to permit the surrogate to infer what the patient would have chosen if able to, based on a familiarity with the patient's lifestyle and patterns of behavior. This is also considered to be a substituted judgment by the surrogate. For example, in the case of Matter of the Welfare of Colyer (Washington, 1983), the patient was a 69 year old woman who had sustained a cardiac arrest. Although she was resuscitated by paramedics, Bertha Colyer suffered massive brain damage. She was placed on a respirator, and remained in a comatose, unresponsive state. "Her prognosis for any sort of meaningful existence was zero." Mrs. Colyer's husband, acting as her guardian, asked a court for permission to remove Mrs. Colyer from the respirator. Although Mrs. Colyer had never explicitly stated her preferences regarding such an act, her husband was able to infer that this would have been her decision as well, had she been able to make it. The court commented:

> There is no evidence that Bertha Colyer explicitly expressed her desire to refuse life sustaining

> treatment. Nevertheless, her husband and her sisters agreed that Bertha Colyer was a very independent woman, that she disliked going to doctors, and, if able to express her views, that she would have requested the treatment be withdrawn. Given the unanimity of the opinions expressed by Bertha's closest kin, together with the absence of any ill motives, we are satisfied that Bertha's guardian was exercising his best judgment as to Bertha's personal choice when he requested the removal of the life support system.

An exception to this general acceptance of an "inferred" decision by the surrogate, is the New York case. Eichner v. Dillon (N.Y., 1981). In that case, Brother Fox, an 83 year old member of the Society of Mary, was being maintained by a respirator in a permanent vegetative state. The local director of the society petitioned a New York court to have the respirator removed. The court explicitly stated that it was not dealing with a case where a third party was attempting to make the decision on behalf of Brother Fox, based on the patient's lifestyle. Rather "Brother Fox made the decision for himself before he became incompetent." That is, the court stated that there was "clear and convincing proof," not just inferences, that the now incompetent patient would wish "to terminate life sustaining procedures when there is no hope of recovery."

In Brother Fox's case, the proof was explicit. The court found:

> he carefully reflected on the subject, expressed his views and concluded not to have his life prolonged by medical means if there were no hope of recovery...(this is) supported by his religious beliefs and is not inconsistent with his life of unselfish religious devotions. These were obviously solemn pronouncements and not casual remarks at some social gathering...That

> this was a persistent commitment is evidenced by the fact that he reiterated the decision but two months before his final hospitalization...What occurred to him was identical to what happened in the Karen Ann Quinlan case, which had originally prompted his decision.

Although the previously expressed views of Brother Fox were oral, rather than written, they were explicit; there were also multiple witnesses to these discussions. His previously expressed concerns were directly applicable to the situation which developed. It is not clear whether a New York court would accept evidence less clear and direct than this in order to permit the termination of life sustaining technology for an incompetent patient. It is, however, highly unlikely that a New York court would at present accept a surrogate decision based solely on the surrogate's general familiarity with the patient and her lifestyle.

In the New Jersey case, Matter of Claire Conroy (NJ 1985) the court discussed the various ways a surrogate might make a substituted judgment, despite the lack of a prior explicit statement. Just as the Colyer court noted such factors as the patient's prior independence, her dislike of doctors, and her family's unanimity on what she would have wanted, so too did the New Jersey court outline relevant information. The court stated:

> ...an intent not to have life sustaining medical intervention...might take the form of reactions the patient voiced regarding medical treatment administered to others...It might also be deduced from a person's religious beliefs and the tenets of that religion...or from the patient's consistent pattern of conduct with

respect to prior decisions about his own medical care. The Conroy court, however, recognized that while all relevant evidence should be considered,

> the probative value of such evidence may vary depending on the remoteness, consistency, and thoughtfulness of the prior statements or actions and the maturity of the person at the time of the statements or acts.

The Conroy court, in fact, set forth three alternative standards for surrogate decisionmaking, which depend upon the amount of evidence regarding the patient's preferences, and the benefits, burdens, pain and suffering which seem to attach to continued treatment. It must be noted, however, that the court restricted its opinion to cases involving, "nursing home residents, suffering from serious and permanent mental and physical impairments, who will probably die within one year, even with treatment, and who, though formerly competent, are now incompetent to make decisions about their life-sustaining treatment and are unlikely to regain such competence." The three standards aree as follows: (1) a "subjective standard," where it is "clear that the particular patient would have refused the treatment under the circumstances involved"; (2) a "limited-objective test," which permits life-sustaining treatment to be withdrawn if there is some trustworthy evidence that the patient would have refused, and "the decisionmaker is satisfied that the burdens of the patient's continued life with the treatment outweigh the benefits of that life for the patient;" and (3) a "pure-objective test," where there is an absence of trustworthy evidence, but the net burdens of the patient's life with the treatment clearly and markedly outweigh the benefits that the patient derives from life. In addition, the "unavoidable, recurring and severe" pain of the patient's life with treatment is such that administering life sustaining treatment would be "inhumane."

Procedural Review of Surrogate Decisionmaking

Whether or not a court of law must review a surrogate's decision to decline or withdraw life-sustaining treatment on behalf of an incompetent patient, varies widely among jurisdictions. Even within the same jurisdiction, some types of cases appear to require more review than others, depending upon such factors as the setting of the decision, the treatment options available and the vulnerability of the class to which the patient belongs. In many jurisdictions, cases of first impression were brought to court precisely because of uncertainty regarding appropriateness of non-judicial resolution. In the context of deciding those cases, courts outlined the required procedures for surrogates to follow which may or may not require regular judicial involvement.

Examples of different state requirements for judicial review of surrogate decisionmaking can be gleaned from case examples from Washington, New Jersey and Massachusetts.

In the context of two cases, for example, (Matter of

Welfare of Colyer, 1983, and Matter of Guardianship of Hanlin, 1984), the Washington courts established the following procedures. If the family, treating physician and institutional "prognosis committee" all agree that it would serve the incompetent patient's best interests to withdraw or withhold life sustaining treatment, then "the family may assert the personal right of the incompetent to refuse life sustaining treatment without seeking prior appointment of a guardian" or prior judicial review of the decision. The Florida Supreme Court has also concurred in this general sort of procedure (John F. Kennedy Hosp. v. Bludworth, 1984). The Florida court stated that the focal point of such decisions, once all parties agree, should be "whether there is a reasonable medical expectation of the patient's return to a cognitive life as distinguished from the forced continuance of a vegetative existence."

Alternatively, the Washington Supreme Court has stated that in cases where no family is available, a guardian must be appointed by a court. However, once there is a court appointed guardian, there is no need for judicial involvement in the substantive decision to withhold or withdraw life-sustaining treatment, if the guardian, treating physicians and prognosis committee are all in agreement. However, in both of these situations, any party is permitted to petition for court intervention, and furthermore, "if there is a disagreement between parties involved in the decisionmaking process, court intervention would be appropriate." (Hamlin).

The New Jersey court, in the Quinlan case (1976) did not expressly address the issue of whether a court appointed guardian was necessary. However, in the case of Karen Quinlan, a 21 year old woman in a permanent vegetative state, the court stated that: (1) if the patient's family and guardian agree, and (2) the patient's attending physicians conclude there is "no reasonable possibility the patient would emerge from her comatose condition to a cognitive, sapient state, and that the life-support apparatus should be discontinued" then, (3) consultation should be sought from the institution's "Ethics Committee." If the Ethics Committee agrees with the attending's conclusion, then treatment may be withdrawn, judicial review is not necessary and there will be no attendant civil or criminal liability for any of the involved parties.

With regard to nursing home residents, in the context of the Conroy case (1985), the New Jersey Supreme Court spelled out special procedures, different from those articulated in the Quinlan case, because of "the special vulnerability of mentally and physically impaired, elderly persons in nursing homes and the potential for abuse with unsupervised, institutional decisionmaking in such homes." Thus, in a long term care facility, life-sustaining treatment can only be withheld or withdrawn from an incompetent resident if the following procedures are followed: (1) There must be judicial determination that the patient is incompetent to make the decision, and if so, a court appointed guardian is necessary. This is required even if the patient has already been declared incompetent, and already has a general guardian, (2) If, based on one of the three articulated surrogate standards (see previous Conroy discussion supra), the guardian believes life-sustaining treatment should be withheld or withdrawn, then he must contact the State Office of the Ombudsman; (3) the Ombudsman will investigate the situation, and must receive evidence concerning the patient's condition from the patient's physician and from two physicians unaffiliated with the facility, who must confirm the patient's medical condition and prognosis; (4) If the Ombudsman receives sufficient supportive evidence, and concurs in the decision to withdraw or withhold treatment, then such action is permitted.

The procedures laid out by the New Jersey court have been criticized by some for their complexity and tendency to limit the applicability of the Conroy decision. Others have praised the protective nature of the rule, given the vulnerability of institutionalized demented elderly. Although judicial involvement in the substantive decision to withdraw or withhold life sustaining treatment is not required, there is need for the involvement and oversight of a state agency. It must also be remembered that this decision, and its procedural requirements, are available only for certain, court-defined nursing home residents (See Conroy discussion, supra).

Finally, in a series of cases (Saikewicz, 1977, Dinnerstein, 1978 and Spring, 1980), Massachusetts set out somewhat confusing and unclear criteria for determining when judicial review of surrogate decisions is necessary. In the Saikewicz case, the Mass. court explicitly rejected the Quinlan procedures, and stated, "We take a dim view of any attempt to shift the ultimate decision-making responsibility away from the duly established courts of proper jurisdiction to any committee, panel or group, ad hoc or permanent." Mr. Saikewicz was a 67 year old institutionalized congenitally retarded man. He suffered from acute and terminal leukemia, and the court stated that only it could permit chemotherapy to be withheld from him.

In the Dinnerstein case, the patient was a 67 year old woman with Alzheimer's Disease in a vegetative state. Her family and physician sought prior judicial approval of a decision not to resuscitate the patient, should she suffer a respiratory or cardiac arrest. The court distinguished the Saikewicz case as one involving treatment that could prolong life: that is, treatment that "contemplates, at the very least, a remission of symptoms enabling a return towards a normal, functioning, integrated existence." Since resuscitation does "nothing to cure or relieve the illness which will have brought the patient to the threshhold of death," the court considered a "Do Not Resuscitate" order a question for the attending physician, not for a court of law.

Finally, in the Spring case, the Massachusetts court attempted to clarify its two earlier opinions. The court articulated a list of factors that might influence the decision as to whether to seek prior judicial approval of surrogate decisions, although the court made no attempt to categorize which combinations of these factors would indeed mandate court review. The factors included: the extent of the patient's mental impairments, whether a state institution had custody of the patient, the patient's prognosis with or without the proposed treatment, the risks of the treatment, the patient's understanding of the risks, the urgency of the decision and the clarity of professional opinion as to what would constitute appropriate medical practice in the given situation. The court in Spring also noted that while "court approval may serve the useful purpose of resolving a doubtful or disputed question of law or fact,...it does not eliminate all risk of liability."

It is thus evident that the necessity for judicial review of surrogate decisions is highly variable, depending upon the jurisdiction, patient condition and setting of the decision. Different jurisdictions place different values on the roles of physicians, families, institutional committees, state agencies, and courts in decisions to withdraw or withhold life sustaining treatment from incompetent patients. This again reflects the tension that underlies these decisions: a tension between permitting the preferences of previously competent, but now incompetent patients to guide surrogate decisionmaking, and protecting those incompetent patients who may be truly alone in the world from the potential abuses of surrogate decisionmaking.

Other Consultative Sources

1. Ethics Committees

In many acute care and long term care facilities, institutional "ethics committees" are available to assist patients, family and caregivers with difficult, ethically troubling decisions. These committees were first given public recognition in the 1976 New Jersey case, *Matter of Quinlan*. Although such committees were virtually non-existent at that time, the *Quinlan* court proposed these committees as "a more appropriate forum" than a court of law for the review of individual circumstances of ethical dilemmas.

The role of the ethics committee varies, depending upon the nature and policies of the institution. In general, the power and authority of such a committee is limited to the institution in which it sits; several state courts, however, have mandated that institutional ethics committees, or "prognosis committees" must be involved in all decisions to withdraw or withhold life sustaining treatment from incompetent patients. In that context, the committee really serves to confirm the attending physician's medical diagnosis, rather than to assist with the ethical dimensions of the decision. (See Quinlan, Hamlin and Bludworth).

Not all institutional ethics committees, however, convene merely to confirm a hopeless prognosis or to review a treatment decision. In many institutions, these committees serve a broader role. As the Quinlan court envisioned, ethics committees can provide a forum for discussing ethically troubling aspects of specific cases, or more general social and ethical concerns that arise in the context of the health care institution. They can also assist with the formulation of institutional policies on issues such as resuscitation or artificial nutrition and hydration. Many of these committees are not only made up of medical professionals, but also of interested individuals such as clergy, attorneys, community agency representatives or administrators who add to the committee's diversity and perspective.

Despite this potential advisory and consultative role for ethics committees, the majority of health care institutions do not have such committees. A 1983 survey found that less than 1% of all hospitals had such committees (MAKING HEALTH CARE DECISIONS). The formation of these committees, however, is on the rise.

2. Ombudsmen

"Ombudsman" is a Swedish term for a person who acts as a "citizen representative." In order for nursing homes to receive Medicaid or Medicare funding, all states are required to have an "ombudsman" program. The ombudsman serves as an advocate for nursing home residents, and he is available to oversee and enforce the rights of these residents. Ombudsmen investigate complaints, and they can even initiate judicial proceedings, if necessary. The Conroy court (see discussion, supra), sensitive to the potential for abuse in decisions to withhold or withdraw life sustaining treatment from incompetent nursing home residents, even incorporated the state's ombudsman as a necessary party in these difficult decisions. Thus, in New Jersey, the state ombudsman must investigate and approve decisions to withhold or withdraw treatment from certain nursing home residents before such decisions can be implemented.

Patient Advocates

Many health care institutions have their own "patient advocates" or "patient representatives," who function strictly within the confines of these institutions. These advocates are available to patients and family, and they provide information and advice on such issues as hospital policy and patients' rights. The helpfulness and effectiveness of these advocates depend upon the specific institution, and its commitment to the role of patient advocates.

Professional Societies

Professional societies not only provide useful information to their constituents, but they can also utilize the combined expertise, experience and prestige of their members to develop and promote important public policies. In the context of health care decisionmaking, professional organizations of physicians, attorneys and even hospitals have often formulated policies that have had an effect upon the delivery of health care, and the rights of patients to make decisions.

For example, early in 1986, two professional organizations issued public policies regarding the withholding or withdrawal of life-sustaining medical treatment. In January 1986 the Los Angeles County Medical and Bar Associations approved a joint policy entitled, "Principles and Guidelines Concerning the Foregoing of Life-Sustaining Treatment for Adult Patients." This was a collaborative effort between attorneys and physicians, with the goal of assisting physicians with the legal and ethical implications of life-support decisions, and educating attorneys and patients as to the issues presented by more advanced medical technology.

Of more national prominence was the March, 1986 public statement issued by the American Medical Association (AMA). Entitled, "Withholding or Withdrawing Life Sustaining Treatment, this statement publicly endorsed the right of the patient or his proxy, if available, to make such treatment decisions. More importantly, the statement added the AMA's voice to the public controversy over the nature of artificial nutrition or hydration. It declared that such artificial methods of feeding constitute treatment, and they, too, can be discontinued in appropriate circumstances. Although this AMA statement is not binding upon anyone, it is a strong statement from a prestigious organization, and it will most likely influence courts and legislators in their future decisions regarding the use of artificial nutrition and hydration for competent and incompetent patients.

Liability Concerns

Physicians, like all professionals, are held to a certain standard of care. If they fall below that standard, and thus cause harm to their patients, they may be liable to their patients for money damages. On the rare occasion that the physician's behavior, as a health care provider, is so egregious as to fall outside of acceptable societal norms, the physician could even be criminally liable.

As stated earlier, in these days of advanced technological capabilities, the progress of technology has often outpaced the legal process. At times, the current law of a jurisdiction is less than certain, or in flux. Variation among the laws of jurisdictions may also exist. In these periods of uncertainty, physicians have, not unreasonably, been concerned about their legal requirements. This concern has often been exacerbated, however, by misperceptions of settled law. The result of these concerns and misperceptions has been an obsession with potential liability, on the part of caregivers, to the detriment of other significant values and factors. In particular, there has been a tendency by physicians to do more, rather than less: that is, because of unfounded concerns about what the law requires, physicians have tended to "overtreat." Unnecessary tests have been ordered and unwanted treatment has been undertaken. Physicians have at times placed their own interests and concerns about civil liability above the clear and recognized rights of patients, particularly the right to refuse life-sustaining treatment.

The use of the criminal law as a mechanism to regulate medical decisionmaking is extremely rare. Indeed, there has only been one recorded case of an attempt to criminally prosecute physicians for withholding or withdrawing life-sustaining treatment from an incompetent patient. In that case (*Barber and Nejdl*, CA, 1983) a patient suffered a cardiac arrest after surgery. He was placed on a ventilator, and his physicians informed his family of the patient's poor prognosis. He was not expected to recover from the deep coma he was in.

The family first requested that the patient be removed from the ventilator. Later, when the patient failed to die, the family asked that the patient's artificial feeding tubes be removed. The physicians complied and were subsequently charged with murder. However, the charges were eventually dropped.

The appeals court that finally ruled on the case commented that, "It appears to us that a murder prosecution is a poor way to design an ethical and moral code for doctors who are faced with decisions concerning the use of costly and extraordinary "life support" equipment." Moreover, the court concluded that in a case where the patient's prognosis, based on standard medical practice, is hopeless, and the family wishes treatment to be withdrawn (including the removal of artificial nutrition and hydration), then physicians have no legal duty to continue treatment, and their compliance with the family's request would not be unlawful. The court, in the Barber case, ultimately supported the physician's actions.

Although physicians, like all individuals, can never fully protect themselves against civil or criminal liability, they must remember that their concerns for their personal interests should not diminish or negate their responsibility to respect the rights and dignity of the patients they treat.

Issues of the Future

The elderly represent the fastest growing segment of the American population. This change in demographics has affected the focus of present day medical care delivery. The elderly tend to suffer from chronic rather than acute illnesses and, due to the nature and type of illnesses that afflict them, the elderly may place more time demands upon physicians, and more cost demands on the health care system. Much of the cost of their care is borne by public reimbursement programs through the Medicare and Medicaid systems.

At the same time these demographics are shifting, there has also been a government push to contain health care costs. There is justifiable concern, therefore, that the elderly, who are so dependent upon the public largesse for the receipt of their health care, will disproportionately bear the burdens of federal and state cost containment measures. Moreover, as increasing cost concerns affect the availability of sophisticated but expensive technology, there is fear that the elderly, who are most often benefited by technology (although at times burdened by it) will be forced to make decisions not on the basis of their desires to receive or refuse such technology, but rather, on the basis of what they can afford.

It is important that the federal government, as a protector of rights as well as a disburser of funds, not mingle these two roles to the detriment of elderly individuals. As the President's Commission stated, "Restrictions on marginally beneficial use of funds must avoid a real or perceived conflict between the role of the government as articulator of rights and responsibilities...and its role as allocator of collective financial resources." (DECIDING TO FOREGO...).

In addition to financial concerns, the shift in demographics will also further the debate over the availability and limits of life sustaining treatments for the elderly. More and more individuals will potentially benefit from these treatments, and yet more and more may be incapacitated by age and illness, and may therefore be unable to express their preferences with regard to the use of these life-sustaining treatments. There is the urgent need to encourage all individuals, but particularly those who are advancing in years, to plan ahead, in advance of future incapacity.

Finally, as the population gets older, the stigma attached to aging should decrease, and thus, so should the disparate treatment of the elderly. The increasing strength and vocalness of such groups as AARP (American Association of Retired Persons) should help awaken all members of society to the realization that a person's age may have no bearing on her capabilities, and certainly, should have no effect on the rights she possesses as a citizen of this country.

Life-Sustaining Technology And The Elderly:

GERIATRIC EXPERTISE IN THE CONTEXT OF CRITICAL AND TERMINAL CARE

submitted by
The American Geriatrics Society
to the Office of Technology Assessment
November 22, 1985
Contract Number 533-5220.0

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This report was prepared under the auspices of the American Geriatrics Society under a contract with the Office of Technology Assessment. It is not an official position paper of the American Geriatrics Society.

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INTRODUCTION

Twentieth century advances in medical science have led to the development of what have been termed "life-sustaining" or "lifesaving" technologies. Generally, these are technologies which prevent or postpone death, and without which death would most likely occur in a relatively short period of time. Included in this definition are treatments such as antibiotics, mechanical ventilators, resuscitation, dialysis, and artificial feeding. These technologies allow health care professionals to do what was not possible prior to this century: influence the course of illness and exercise some control over the time and manner of death. Avorn summarized medical progress as follows:

> Until a century ago, medical therapy was for the most part both cheap and useless, posing no great problems of distributive justice. Quite the opposite is now the case. The remarkable progress of biomedical technology since World War II has made it possible for physicians to keep sicker and sicker patients alive longer and longer, at greater and greater cost. (1984: 1295)

The elderly, who have a higher prevalence of chronic illnesses and who are higher per capita consumers of medical care than the general population, are rapidly increasing both in absolute numbers and as a percentage of the total population. This "demographic imperative" is expected to create a greatly increased demand for health care services for the elderly, including life-sustaining technologies. In order to meet the demand, health care providers need certain specialized knowledge and skills. This report will explore the nature of the expertise required for care of the critically and terminally ill elderly: what this expertise consists of; who does and who should have it; and how training and credentialling may affect the distribution of expertise as well as the delivery of care.

A HISTORY OF NEGLECT

The roots of geriatric medicine extend back to the late nineteenth and early twentieth centuries; the first textbook of geriatric medicine was published in 1914 (Robbins _et al_ 1982a). In the early 1940's, when the American Geriatrics Society was formed, interest in the elderly seemed to be increasing; however, geriatrics was never significantly incorporated into the mainstream of academic or clinical medicine in the United States. In a 1983 AMA survey, only 714 out of 501,958 physicians responding identified themselves as geriatricians (Eiler 1984).*

A Lack of Training

Freeman surveyed American medical school catologues in 1971 and found that more than half of the schools had no course listings which made reference to geriatrics or aging; at schools which did have listings, they most often were general courses which included some instruction in geriatrics. There were relatively few references to separate courses in geriatrics, and all of these were elective rather than required courses. He concluded that "the question of geriatric education has not made much impact upon scholastic policies of United States medical schools." (1971: 746). Another survey performed five years later concluded similarly that:

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*A RAND report by Kane _et al_ (1980a) based on data from the 1977 AMA Physicician's Masterfile determined that self-reported geriatricians were less likely to be members of professional societies or to be board-certified than the average physician. In contrast, Maklan (1984) surveyed physician members of the American Geriatrics Society and the Gerontological Society of America and found that they had higher rates of board-certification than did physicians nationally. The higher certification rates reported by Maklan may be due in part to an expected correlation between membership in a professional society and board-certification, and in part to increases in national rates of board-certification. However, they may also indicate that changes in the group of physicians who identify themselves with geriatics have taken place since the 1980 Rand report.

> medical schools in this country continue to assign a fairly low priority to the teaching of geriatrics. Only a few schools seem to consider geriatrics important enough to offer it as a separate subject, and almost all schools failed to require it. (Apkom and Mayer 1978: 67)

A more recent survey of medical schools found that more schools report having courses in geriatrics or with geriatric content (Barry and Ham 1985);* however, such courses still appear to reach at best a limited number of students (Robbins et al 1982b)

Undergraduate nursing education seems to have paralleled medical education in its failure to develop geriatric curricula. Nursing literature makes little reference to nursing school courses in geriatrics; there is no evidence that geriatrics is widely taught either as a separate subject or as a component of more general subjects. Thus, there appears to be little content in undergraduate nursing education specifically related to geriatrics.

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*As these authors point out, their survey methods made no attempt to assess the content of courses; it is possible that some of the "new" courses in geriatrics represent changes in course names rather than in curriculum.

Beyond medical school, there have been relatively few opportunities for physicians to receive instruction in geriatrics. Until very recently, care of the elderly has not received specific attention in primary care and other postgraduate residency and fellowship training programs. The first fellowship in geriatric medicine was established as recently as 1972 (Libow 1972); in 1982, one survey found that nationwide there were only 36 fellowship programs with 87 positions that produced only 40 graduates per year (Robbins et al 1982b).* Revenues for geriatric fellowships have come from the Veteran's Administration and a very few other agencies; monies which traditionally are used to support fellows in procedure-oriented fields such as cardiology are not available to fellows in geriatric medicine.

Until recently, there were relatively few geriatric continuing medical education (CME) programs for physicians. For the past fifteen years, the American Geriatrics Society has been the primary sponsoring organization in geriatric medicine, usually sponsoring ten to twenty courses per year. CME programs and courses in geriatrics were largely unavailable at the local level. In the last two or three years, medical schools, state and local medical societies, and others have increasingly offered CME courses, including courses aimed jointly at physicians and nurses.* Some, although labelled "geriatric," were not really directed to the special needs of the geriatric patient.

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*Batra (1985) completed a more recent survey of fellowship programs and found that the number of programs had increased; no attempt was made to determine the number of graduates per year.

Postgraduate nursing certification in gerontology originated at about the same time that medical fellowship training in geriatrics was first begun. Certification is clinically rather than academically oriented and is based on successful completion of a standardized test and two years of clinical experience with the elderly; no specific didactic or clinical training in geriatrics is required. Since its inception in the mid 1970's, the certificate in gerontological nursing has become one of the most frequently awarded nursing certificates (ANA 1985); postgraduate geriatric education and credentialling has assumed a more significant role in nursing than in medicine. Continuing education programs in geriatric nursing have also been more widely available than their medical counterparts.

Postgraduate geriatric training in both medicine and nursing has not frequently included special training in the care of the critically ill elderly. Geriatric fellows generally do not receive training in intensive care units, where many elderly patients are treated with life-sustaining technologies. Experience in nursing care of the critically ill elderly is not required for certification in gerontological nursing; in addition, the certification exam does not test knowledge of this area of nursing. Conversely, postgraduate medical and nursing training in the care of the critically ill does not appear to have included specific geriatric curricula.

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*Since CME has often been undertaken in order to raise money for a given organization or institution, the recent proliferation of courses directed to geriatrics suggests that these organizations perceive an increased physician interest in geriatric medicine.

Neglect in Clinical Practice

Although suggestive, a lack of formal training does not necessarily mean that providers are unprepared to treat the elderly or that the elderly receive inadequate or substandard care. Some authors have argued that geriatric care is not a unique or specialized activity but rather a basic component of general internal medicine or other primary care specialties (Leonard 1976). Unfortunately, there is considerable evidence that educators and practitioners of medicine and other fields have not paid sufficient attention to the needs of the elderly.

Data from a national study of patient-physician encounters revealed that, contrary to what one would expect, physicians, on the average, spend less time with elderly patients than with younger ones (Kane 1980a; Mendenhall et al 1978a; Mendenhall et al 1978b). While this in itself is not conclusive proof of systematic neglect (e.g., there may be fewer interventions physicians can provide for the elderly), other direct and indirect evidence indicates that the actual care delivered may often be substandard or incomplete.

Data on elderly nursing home patients indicates that physicians are reluctant to make nursing home visits and that the care these patients receive is often marginal at best (Mitchell 1982; Rango 1982; Garibaldi et al 1981; Brown and Thompson 1979; Miller et al 1976; Kane et al 1977; Solon and Greenawalt 1974); a number of studies have also concluded that health professionals generally hold negative attitudes towards all elderly patients and toward the elderly in general (Perrotta et al 1981; Solomon and Vickers 1979; Wolk and Wolk 1971; Spence et al 1968). Newly formed geriatric consultation units have reported finding many elderly inpatients who had conditions which had been either misdiagnosed or overlooked entirely; many of these were potentially treatable (see, e.g., Campion et al 1983; Lichtenstein and Winograd 1984).

Causes of Neglect

A number of hypotheses have been postulated to explain the health care profession's reluctance to address the problems of the elderly. One of the most frequently cited explanations is a phenomenon called "ageism." Butler and Lewis used this term to describe negative attitudes and prejudice towards the elderly; they characterize its causative roots as follows:

> Prejudice toward the elderly is an attempt by younger generations to shield themselves from the fact of their eventual aging and death and to avoid having to deal with the social and economic problems of increasing numbers of older people (1977: 143).

Medical neglect of the elderly is no doubt due in part to provider attitudes which reflect a generalized societal bias of this type against the elderly; however, cultural stereotyping alone probably does not account entirely for medical neglect of the elderly.*

In a classic study of medical education, Becker et al noted that "where the physician's work does not afford (at least in some symbolic sense) the possibility of saving a life or restoring health through skillful practice or losing them through ineptness, the physician lacks some of the essence of physicianhood" (1961: 316). Similarly, Katz has cited evidence suggesting that physicians are more fearful of their own death than the general population and commented that "doctors view death as a personal defeat rather than an eventual inevitability to which they, like their patients, must submit" (1984). Medical neglect of the elderly may be as much or more a result of these aspects of medical culture than a general societal stereotype.*

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*Perrotta et al found that first year medical student attitudes towards the elderly do not correlate with their attitudes towards geriatrics and caring for the elderly (1981). If stereotyping alone were the cause of neglect, one would expect that improved attitudes would lead to increased interest in caring for the elderly. These authors did not survey upperclassmen or follow the freshmen longitudinally to assess the effect of professionalization on these initial points of view. Matteson and Smith studied the relationship between medical students' occupational preferences (the specialties they would most like to enter) and their occupational choices (the specialties they actually chose and took steps to enter) (1977). Their results indicated that preferences differed from choices, suggesting that determinants of professional behavior are multiple and complex in nature; unfortunately, the authors did not separate and compare the responses of different classes, and seniors were underrepresented due to their low rate of response to the survey (16%). As a result, the effects of professionalization were not distinguished from other determinants of behavior and, due to the poor participation of seniors, may have been underrepresented in the final results.

*Physicians responding to an AMA poll made some of the following comments about geriatrics:

'There are frequently frustrating and unpleasant duties

Eisdorfer has argued that inadequate care of the elderly stems from an American obsession with technology coupled with the use of what he calls the "acute institutional model" (1981: 2576) in an inappropriate context. In his words:

> The problem is based on a deep-rooted community belief that hospitals and intensive care institutions are the best way to provide care. Better hospitals are thought to be characterized by better, newer, and more exotic equipment and procedures, both surgical and medical.
>
> . . . .
>
> The aged population certainly suffers from acute illnesses, but their major health difficulties are largely chronic and often relate to a decline in their functional capacity, their ability to care for themselves in everyday situations. Yet these long-term care problems are not given the priority of acute or short term, hospital based emergencies. In our conscientious desire to preserve life we have ignored the needs of the living (1981: 257).

These patterns of practice are in turn reinforced by reimbursement patterns that reward technological intervention and acute care:

> Physician reimbursement and training are linked to technology. The same physician will generate several times more income per hour for spending the same time at a machine interface or in the surgical amphitheater than by taking a careful history, doing a physical examination, discussing factors that may have led to the disease, or ensuring that patients understand their disease and will be able to follow the therapeutic regime prescribed (1981: 257).

In a similar vein, Libow has commented:

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associated with geriatrics,' commented one MD. 'No dramatic cures are possible,' said another. 'It's not challenging,' commented a third. . . . '[T]he patient isn't going to become well again, the physician feels he has failed and so abondons the patient,' theorized one respondent. . . . '[T]hey themselves [doctors] are unable to face up to the problems of death and dying,' said others (Gruber 1977: 495).

> older patients are somewhat of a losing proposition if they are considered simply in a business sense. The elderly, who often exhibit multiple problems, require more time for proper evaluation than younger patients. Yet, unfortunately, there are no time factors built into Medicare or Medicaid fees. In contrast, the elderly's single organ illnesses, such as cataracts, prostate problems, and hip fracture, usually are enthusiastically and expertly managed, with the doctor being reimbursed at an inappropriately high dollar:time ratio (1977: 99-100).

Medicare and Medicaid, which are the major third party payers for the care of persons 65 and over, are modeled after private insurance policies such as Blue Cross and Blue Shield which were designed primarily for patient populations consisting largely of healthy workers. Like the private insurers, they cover mainly acute institutional care and physician office visits; they do not provide coverage for other types of services commonly required by the elderly. Coverage for medical services such as visiting nurses and home health aides is limited or nominal and often inadequate to meet the needs of many noninstitutionalized elderly persons who are functionally disabled as a result of chronic illness; Medicare will not provide any services unless skilled nursing services are needed, a situation not present for the majority of elderly persons who need assistance with activities of daily living. Coverage for social services such as homemakers and personal attendants to provide help in walking, dressing, bathing, eating and other personal needs is not provided.

Medicare will not reimburse for nursing home care unless the care is of very limited duration and necessary to achieve a specific, realizable medical goal; long term care for stable chronic problems is not covered. Medicaid will reimburse for long term nursing home care (it currently pays for 50% of all such care); however, in order to qualify for such care, recipients must exhaust their personal resources (a process termed "spend down") until they reach a sufficiently impoverished level.

The effect of these terms of coverage is to reward and encourage episodic acute care with economic incentives while discouraging the provision of chronic care (nursing home and rehabilitative care, assistance with activities of daily living, etc.), which is necessary to meet the special needs of the elderly.

Problems inherent in performing research on the elderly probably have contributed to academic medicine's neglect of the elderly. The chronic nature of much geriatric illness makes prospective cohort studies desirable, but also expensive and time consuming; and makes retrospective cohort studies more susceptible to recall bias and other data acquisition problems. Because of the multiplicity of exposures which occur over the course of chronic illness, as well as the high prevalence of comorbidity in the elderly, it is often difficult not only to control for confounding factors and bias but also to establish causal connections between interventions and outcomes. There are also difficulties in defining illness (e.g., distinguishing between those changes due to normal aging and those due to disease), measuring outcome (e.g., choosing between disease specific and functional disability measures), and analyzing results (e.g., assumptions regarding population distribution which underlie certain types of statistical analyses may not be valid in geriatric populations) (Zimmer et al 1985; Williams and Retchin 1984; Rowe 1977).

In addition to these methodological obstacles, political and organizational factors discourage physicians who wish to make geriatrics the center of an academic career. The relatively few academic geriatricians are often called upon to perform an inordinate number of tasks. For example, a geriatric unit often consists of only one or two physicians who are expected to teach, perform research, provide primary patient care, and conduct a consult service, without additional faculty support. Finally, academicians who identify themselves as geriatricians have not yet attained the prestigious positions (e.g., chairmen of a department of medicine or dean of a medical school) or received the high status and regard that have been accorded to academics in other fields such as internal medicine (Rowe 1985a; Steel 1984a).

THE ELEMENTS OF EXPERTISE

The type of technical expertise required to meet the needs of the critically and terminally ill elderly will be determined largely by two factors: 1), the patterns of illness found in the elderly population, and (2), the types of technology available to treat the illnesses of the elderly. In addition to technical knowledge regarding diagnosis and treatment of illness in the elderly, providers must also possess the decision-making and administrative capabilities to utilize their knowledge in a manner which is consistent with both the principles of patient self-determination as well as the goals of promoting patient health. In this section, the technical knowledge associated with caring for the elderly will be considered; in the following section, the manner in which such expertise may be applied to attain desired goals will be discussed.

Patterns of Illness

Geriatrics is often thought of as a "low tech" field, as essentially the care and maintenance of nursing home and other patients with chronic, irremediable problems. Under this view, the concepts of critical care and geriatrics might seem antithetical and mutually exclusive. Although there is an element of truth in this characterization, it is for the most part false and misleading.

The Content of Geriatric Medicine

The elderly often suffer from chronic illnesses; and elderly populations have a greater prevalence of morbidity as measured by disability and bed restricted days, as well as by self-reported health status and limitation (U.S. DHHS 1983*). The majority of nursing home patients are age 65 or older, and persons 85 and over are at significantly higher risk for institutionalization than persons in younger age groups. However, the majority of elderly people (about 95%) do not reside in long term care facilities (Rice and Feldman 1983), and a large majority (about 70%) estimate their health status is "fair" or better (U.S. DHHS 1983*).

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*The data cited here was derived from surveys of civilian, noninstitutionalized people.

The elderly account for 35% of visits to internists, general practitioners, and family practitioners (Kane *et al* 1980a); some authors have estimated that this number will increase to 75% by the year 2000. The elderly represent a substantial number of patients in hospitals and intensive care units; studies of intensive care units have noted that a large portion (up to 40 to 50%) of all patients admitted to such units were elderly (age 60 to 65 or older (see, e.g., Campion *et al* 1981; Thibault *et al* 1980). Care of the elderly occurs regularly in all medical settings, not just the nursing home, and includes a wide range of severity of illness and possible interventions; as one British author has stated, "the variety of medical work on a geriatric ward can equal or surpass that of a general ward" (Webster 1979: 115).

Most authors believe geriatrics falls within the sphere of internal medicine and/or family practice. Nevertheless, care of the elderly can be meaningfully distinguished from care of other adult groups. The elderly are a clinically distinct group as a result of both: 1) the effects of a declining physiological functioning which accompany normal aging, and (2), the presence of chronic diseases. These considerations shape the patterns of illness and determine the nature of medical care of the elderly.

Age-Associated Alterations in Function

Aging is accompanied by a progressive decrease in organ system performance and functional capacity. For example, beginning at about age 30, performance markers for renal (creatinine clearance, renal blood flow), respiratory (vital capacity, maximum oxygen uptake), and immune (T-cell activity) systems begin to decrease in a roughly linear fashion; declines in other systems have also been noted (Kane _et al_ 1984; Libow and Sherman 1981; Shock 1977).* Shock has pointed out that age associated decrements in performance are caused not only by loss of raw organ function, but also by a loss of effectiveness of homeostatic control mechanisms (1977).

Increasing age is also associated with a greatly increased prevalence of chronic diseases (e.g., chronic renal failure, congestive heart failure, chronic obstructive pulmonary disease, cancer); frequently, the elderly suffer from two or more such conditions. Of all age groups, the "old old," i.e., persons over 80 years of age, have the highest prevalence of chronic illness.

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*Reported changes in other systems include decreases in cardiovascular function, bone substance, muscle size and strength, visual acuity and accommodation to light, perception of high pitched sounds, intellectual performance, and complex learning abilities.

Much of the information regarding the effects of normal aging on organ function was obtained from cross-sectional studies which compared the data obtained from different age groups at the same point in time. Since each age group in a cross-sectional study represents a different cohort, systematic differences may represent the effects of confounding factors (e.g., differences in diet, occupational and environmental exposures, etc.) rather than aging. In addition, older subjects represent a biologically superior cohort of survivors; cross-sectional studies will seem to show false age related changes in variables which are related to survival, or will obscure the nature or degree of change in variables which are related to both age and survival. To date, results of studies which recorded data from the same people followed longitudinally seem to indicate that changes associated with aging are less dramatic in magnitude and begin later in life than cross-sectional data would suggest. (Kane _et al_ 1984; Shock 1977; Rowe 1977)

Andres has observed that the distinction between the effects of normal aging and the effects of chronic illness is not always easy to make and can sometimes be misleading.* Age-associated changes are not necessarily benign just because they are "normal;" they may contribute to illness and morbidity by predisposing the patient to an acute illness or by altering the patient's ability to respond to an acute insult. In his words:

> In real life the changes that occur with the passage of years occur at different rates in different individuals and may indeed by inevitable. Does that make them "normal"? The changes that occur clearly influence the likelihood of development of discrete disastrous events as age advances--events which fall under the unbrella of disease: a myocardial infarction engrafted on years of accumulated atherosclerotic change, a fractured hip following years of calcium loss from bone, diabetic retinopathy following years of glucose intolerance. Did the apparently healthy elderly woman at the moment prior to the fracture manifest only the normal, physiological changes of age? (1985: 38)

Some age-related changes in patients over 85 which seem to be present in essentially all individuals effectively "become" illnesses in the sense that they require identification and medical management.

Physiologic decline occurs at different rates in different individuals; even in the same individual, the rate of decline for each organ system is different from, although sometimes related to, the rate of decline in other systems (Costa and McCrae 1985; Butler 1983). Similarly, there is great variability in the distribution and progression of chronic disease among elderly individuals. As a result of this clinical heterogeneity, elderly patients must be evaluated individually and treatment regimens modified to account for age-related decrements in physiologic function and the presence of one or more diseases. Medical treatment of the elderly frequently requires recognition of multiple interrelated problems.

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*For the clinician, it is less important whether age associated changes are attributed to normal or pathologic processes and more important whether these changes should be considered risk factors for which intervention is indicated. For example, progressive glucose intolerance is associated with increasing age. Whether and at what point this should be labelled a disease (diabetes) is less important than whether or at what point intervention will prevent development of diabetes associated complications such as retinopathy.

The distinction between normal aging and disease has greater significance for researchers who plan studies to determine the causes of age-related change, and how, if at all, the progress of these changes can be altered.

The presence of one chronic illness may be a relative contraindication to the use of otherwise desirable drugs, or may alter the range of dosages at which drugs may be used safely, for treatment of other concurrent illness. For example, the treatment of hypertension with a class of drugs known as beta-blockers may exacerbate chronic obstructive pulmonary disease or congestive heart failure in the elderly. Patients with chronic illness related to the method of elimination for a particular drug (for example, chronic renal failure in a patient treated with digoxin for congestive heart failure) must have dosages for the drug adusted accoringly (Vestal 1978).

Dysfunction in one organ system may predispose the patient to new illness or exacerbate already existing illness in other systems. For example, in a patient with both chronic renal failure and congestive heart failure, worsening of the renal failure may result in fluid retention which puts further strain on the heart and worsens the heart failure; alternatively, a worsening of the heart failure may cause a decrease in the amount of blood perfusing the kidneys, thus further aggravating the chronic renal failure and perhaps even precipitating acute renal failure and the need for dialysis.

Elderly patients with multi-system disease often require the use of several therapies concurrently to treat their illnesses. For example, patients who with both chronic renal failure and chronic obstructive pulmonary disease who develop a pneumonia may require dialysis, mechanical ventilation, and antibiotics. Since oral ingestion will not be possible while the patient is receiving ventilator support, he or she will become malnourished if the ventilator is used for more than a brief period of time and thus artificial feeding will also become necessary.

The Goals of Geriatric Medicine

Medical problems of the elderly may be grouped into two categories: 1) nonacute problems due to chronic illness, and (2), acute problems which may be related to or complicated by chronic illness. Because chronic illness and physiological decline cannot be "cured" in the usual sense of the word, the problems of the elderly often do not fit into the traditional medical model of illness as an acute, reversible phenomenon. Consequently, geriatricians have suggested that traditional medical goals are not appropriate for care of the elderly. They argue that improvement of function and quality of life (as perceived by the patient), rather than the eradication of illness, should be the guiding principals behind care; these goals encompass the care of many chronic problems which cannot be cured, including management of the symptoms and psychological needs of the terminally ill (see, e.g., Rowe 1985b; Hazzard 1985; Greer 1983; Portnoi 1980; Poe 1975). Williams and Hadler summarized these principles in a recent article:

> A disease-specific focus deemphasizes the dominant issue in the management of chronic illness, which is the maximization of the patient's productivity, creativity, well-being, and happiness. This goal of improving patient function and satisfaction to the utmost is usually achieved without curing the underlying disease. (1983: 1357)

The importance of assessing and preserving function was acknowledged in both an Institute of Medicine report on geriatrics and medical education (1978) and a Federated Council on Internal Medicine statement on geriatric medicine (1981).

In a sense, improving function and quality of life have always been the goals of medicine. At the beginning of the twentieth century, the elderly made up a much smaller portion of the population; many people died of acute illness before they could reach old age, and the chronic diseases associated with old age were therefore less prevalent (Fries 1980; Gruenberg 1977). Under such conditions, the cure of acute illness was tantamount to the restoration of full function and quality of living.

Since the turn of the century, a greater number of people have survived to old age and then died relatively soon thereafter. Fries (1980) attributed this phenomenon to "the elimination of premature mortality"--that is, to the reduction of mortality from acute illnesses in the young. Most authors agree that chronic diseases have increased in prevalence as a result of altered survival patterns; however, the theories on aging and predictions of future mortality and morbidity trends which various authors have inferred from this phenomenon differ greatly (Schneider and Brody 1983; Manton 1982;Fries 1980; Gruenberg 1977).*

The Role of Life-Sustaining Technology

Reduction of premature mortality probably is due to a number of causes: improved sanitation and other public health measures, improved living conditions, and improved therapy for infectious diseases and other acute illnesses have each been identified as causes. The latter--medical progress--includes the life-sustaining technologies which are the focus of this report. Gruenberg has argued that medical progress has reduced mortality but, paradoxically, has also contributed disproportionately to the increase in morbidity. The reason, according to him, is that

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*Fries (1980) believes that there is a "natural" limit to lifespan which is fixed at about 85 years, and that if the onset of chronic illness can be delayed until after this point, people will live without chronic disease morbidity until about age 85, they will die suddenly of "natural" causes; in this way, morbidity will be "compressed." Gruenberg (1977) believes that increases in lifespan are possible, but that they will be accompanied by increases in the the average duration of chronic diseases; as a result, the prevalence of chronic diseases will also increase.

Although they reach different conclusions, both Fries and Gruenberg believe that changes in morbidity are largely independent of changes in mortality rates. In contrast, Manton (1982) believes that they are by their nature related and that increases in lifespan will be associated with decreases in chronic disease severity; thus, while the number of persons with chronic diseases will increase, each person will require, on the average, less medical care.

Regardless of which, if any, of these theories of long term trends in morbidity and mortality are correct, it seems clear that the elderly population is now rapidly increasing and the absolute demand for medical services related to chronic diseases in this population will increase rapidly in the near future.

> these successful life-saving measures were disproportionately needed in people suffering from an incurable disease or disability. But these new techniques did not cure the chronic diseases, nor did they prevent them in the next patient. (1977: 4)

The extent to which medical progress in treating acute illness has been applied mostly to critically ill persons with concomitant disabling chronic and terminal illness rather than otherwise healthy individuals is debatable. However, the fact that medical progress can contribute to an increase in chronic morbidity is apparent in everyday clinical practice. Antibiotics, ventilators, dialysis, nutritional support and other life-sustaining technologies permit many patients to survive the acute complications of their chronic illnesses, thus increasing the average duration and prevalence of morbidity.

For example, a patient with a disabling, chronic neurological disease such as Parkinson's disease or paralysis resulting from stroke may, as a result of poor upper airway muscular control, develop an aspiration pneumonia which in the past would have been fatal. This patient can now be treated with antibiotics, mechanical ventilation, and other technology so that he or she may survive the acute illness. Unfortunately, the underlying, chronic condition remains unchanged, the duration of the chronic condition is increased, and the patient is still susceptible to a recurrence of the aspiration. The patient with previously asymptomatic atherosclerosis may, as a result of intensive resuscitative efforts in the coronary care unit, survive what otherwise would have been a fatal heart attack; however, he may not return to his previously asymptomatic state. He may suffer from chronic sequelae such as congestive heart failure, and may now live long enough to develop other complications related to his atherosclerosis, such as stroke.

The life-sustaining-technologies which are the product of modern medical progress have improved our ability to treat acute illness. Unfortunately, they have not affected our inability to cure chronic illness. Given the prevalence of chronic illness and physiological decline in the elderly, it seems clear that the treatment of acute illnesses can no longer be considered as being synonymous with improvement of function and quality of life.

Technical Expertise

Care of the critically and terminally ill elderly may involve treatment of an acute illness or injury, treatment of an underlying chronic condition, or both. Although they are often thought of as acute care interventions, life-sustaining technologies may be used to treat both kinds of problems.

Critical or intensive care units (ICU's) routinely employ sophisticated technology and equipment to monitor and maintain function in acutely failing organ systems. They maintain equilibirum and support organ function during a life-threatening event in order to give the patient's own recuperative abilities or definitive medical therapy an opportunity to act. In the critical care context, life-sustaining technologies frequently represent a component of the treatment of acute, life-threatening illness.

Life-sustaining technologies are also delivered outside the ICU under less emergent conditions. For example, dialysis, respirators, and artificial feeding may all be used in an outpatient setting. Under these conditions, life-sustaining technologies represent a means of treating a relatively stable (albeit potentially life-threatening) chronic illness.

The administration of life-sustaining technologies to the critically and terminally ill elderly is carried out by physicians, nurses, and other specialized personnel such as dietitians and respiratory therapists. Each provider has a different role in the delivery of care and must possess a special body of knowledge or expertise in order to perform his or her role. Provider roles may vary somewhat in different settings; for example, nurses play a more active role in monitoring patient status and in modifying treatment in an ICU than they do in other settings. In general, however, physicians diagnose the patient's problems and select and oversee treatments. Nurses deliver the treatments prescribed by physicians and monitor the patient for changes which may require changes in therapy. They also diagnose and manage certain kinds of physical and psychological discomfort that do not require physician intervention.

Technology-Specific Expertise

Some of the expertise associated with the delivery of care is specific to the particular technology being used. Physicians must know the indications and contraindications of the available technologies so that they may offer appropriate treatment, and must be able to recognize and treat complications. Nurses and other personnel must know how to apply the prescribed technology and assess patient response. While the basic principles of this type of expertise will remain the same regardless of patient age, the application of these principles to treat patients is often more difficult and complex with elderly patients than with other adult patients due to their more complex patterns of illness. In order to clarify these points, some illustrative examples will be given using three commonly used life-sustaining technologies: artificial feeding, dialysis, and respirators. There is also a body of knowledge which is not specific to any particular technology, but which is relevant to the care of frail elderly patients in need of life-sustaining treatment. The latter type of expertise will be considered later in this report.

Examples of Technology-Specific Expertise

In order to employ artificial feeding to sustain a patient with inadequate nutritional intake, providers must possess certain information essential to the safe and competent use of this technology. The physician must be able to recognize that the patient is malnourished and determine that artificial feeding is necessary. He or she must be aware of the different methods of feeding available, the amount and type of nutrition each can deliver, and the additional indications and contraindications which help determine which method of feeding is appropriate for a given patient. The physician must also be able to recognize and treat complications, such as alterations in liver function. (MacBurney and Wilmore 1981; Steffee 1980; Heymsfield 1979; Fischer 1979)

Nurses must know the proper protocols and procedures used for each type of artificial feeding; be able to operate the machines which regulate infusion of nutrients if such machines are used; and be able to manage potential complications such as clogged feeding tubes or large volumes of residual fluid in the stomach indicating disturbed gastrointestinal motility.

Other personnel frequently participate in the provision of artificial feeding; they, too, must possess expertise specific to this technology. Dietitians are often consulted to recommend the feeding formula or combination of formulas which should be used to meet the patient's needs. The dietitian, therefore, must be able to determine the patient's current caloric and protein intake, assess the patient's needs in these areas, and be familiar with the specific feeding formulas which are available to meet these needs. Dietitians may also play a role in initiating artificial feeding in malnourished patients by recommending use of such treatments to physicians, who will then determine whether this approach is indicated in light of the patient's overall condition. (Nestle 1984; Jensen 1984)

The use of dialysis requires that providers possess analogous types of knowledge specific to the technology. Physicians must be aware of the types of dialysis therapies available (e.g., peritoneal dialysis versus hemodialysis) and the clinical conditions which favor one type over another; and must be able to treat potential complications such as harmful alterations in blood serum chemistry. A nephrologist must usually be consulted to make specific treatment recommendations (e.g., the length and rate of treatments, composition of the dialysate, etc.). (Comty and Collins 1984; Lowrie and Teehan 1983; Twardowski and Nolph 1984; Lauer et al 1983; Friedman 1984) Nurses and technicians must be able to utilize the equipment and monitor the patient. Nurses especially must be able to monitor patients for complications (e.g., a drop in blood pressure) and either treat these problems themselves (e.g., treat a drop in blood pressure by giving saline [salt water] or blood to restore volume) or, in more serious cases, consult the attending physician. Nurses who administer dialysis usually are specially trained to perform these functions. (AANT 1982)

When ventilators are used, physicians must be able to determine if mechanical ventilation is indicated; to select the type of ventilation technique which is most appropriate for the patient's condition; and to recognize and treat complications such as pneumothorax (collapsed lung). (Hayes 1982; Weisman _et al_ 1982; Carlon _et al_ 1984) Nurses must be able to observe patients for signs of complications and ensure the safe and proper delivery of therapy by maintaining the integrity of the patient's airway (e.g., by periodically suctioning out accumulated fluids). Respiratory therapists often play a crucial role in the administration of mechanical venitilation by either assisting nurses in the operation of the ventilator and in airway maintenance or by performing these functions themselves.

Application of Expertise in Geriatric Populations

The technology-specific expertise discussed so far applies to the use of life-sustaining technology in all age groups, not just the elderly; however, the application of this expertise is frequently more difficult and complex with the elderly because of their stress intolerance due to chronic dysfunction and high frequency of comorbidity. The presence of multiple chronic diseases sometimes makes the delivery of effective overall treatment an elusive goal.

For example, dialysis therapy may be affected in a number of ways by the presence of coexisting chronic disease. Vigorous hemodialysis (desirable because of increased efficiency and shorter treatment times) does not seem to be tolerated well by patients with impaired cardiovascular function, who require gentler treatments over longer periods of time. In patients with chronic obstructive lung disease, the use of large fluid volumes for peritoneal dialysis (desirable for the increased efficiency) is associated with further compromise of lung function. Patients with diabetes may need to have their insulin dosages adjusted; in addition, many other common drugs must also be modified in dosage for dialysis patients. (Comty and Collins 1984; Lowrie and Teehan 1983)

Similar problems may occur with the use of other technologies. For example, elderly persons with chronic obstructive lung disease who are placed on a ventilator may survive the event for which therapy was indicated but often are difficult to subsequently wean from the ventilator. If the same type of patient also requires nutritional support, then he or she must be given a special low glucose diet to prevent a buildup of carbon dioxide in the bloodstream which will exacerbate the patient's respiratory condition (Askanzi *et al* 1984; Askanazi *et al* 1981). PEEP (positive end-expiratory pressure) ventilator therapy may decrease cardiac output; as a result, patients receiving PEEP may also require invasive hemodynamic monitoring techniques such as placement of a Swan-Ganz catheter. Unfortunately, PEEP also makes cardiovascular status more difficult to monitor due to the increased chest pressure it generates; thus, PEEP may potentiate heart failure and also complicate its treatment. In patients with underlying chronic cardiovascular disease, the balance between therapeutic and toxic levels of PEEP is even more precarious. (Hayes 1982; Weisman *et al* 1982)

The Rise of Intensivists and ICU's

The principles behind some modern life-sustaining technologies are literally centuries old; as early as 1555, Vesalius managed to keep a dog alive by directing air through a tracheostomy to inflate its lungs (Hayes 1982). However, the widespread development and application of modern life-sustaining technologies has occurred mainly over the last 30 years (Weil and Shubin 1971). During this period, the development of effective technologies has been parallelled by the creation of new specialties--critical care medicine and nursing--and a new setting for practice of these specialties--the ICU. The National Institutes of Health (NIH) Consensus Conference characterized critical care medicine as:

> a multidisciplinary and multiprofessional medical-nursing field concerned with patients who have sustained or are at risk of sustaining acutely life-threatening single- or multiple-organ system failure because of disease or injury. These conditions necessitate prolonged minute-to-minute therapy or observation in an ICU that is capable of providing a high level of intensive therapy in terms of quality and immediacy. (NIH 1983: 798)

Patients in need of or at risk for needing critical care are usually treated in ICU's, which are now widely distributed throughout the United States. Generally, ICUs are physically separated from general medical and surgical wards. They are usually comprised of a unit director (a physician); a relatively high number of nurses per patient; various other personnel (house staff, respiratory therapists, ICU technicians, nurse's aides, etc.); and a variety of devices, machinery and supplies necessary for the delivery of critical care. (Greenbaum 1984; NIH 1983; Knaus *et al* 1981; Phillips *et al* 1983)

Two types of patients are treated in ICUs: those that are critically ill and are admitted for treatment and monitoring, and those that are at high risk for becoming critically ill and are admitted primarily for monitoring (NIH 1983; Thibault *et al* 1980). Knaus *et al* (1982) found that ICUs vary in their criteria for admission, patient case-mix, and methods of treatment; however, when patients in different ICUs were matched for severity of illness, outcomes were found to be similar. As Jennet (1985) has noted, this does not mean that intensive care does not influence outcome. Rather, it indicates that it is the intensiveness of the medical and nursing care and not the specifics of the protocols or technologies employed which is most important in affecting outcome. Intensive nursing care is is a particularly important component of care for patients who require close monitoring.

The relatively narrow goals of critical care medicine and nursing (alleviation and prevention of immediately life-threatening illness), together with the decision-making and therapeutic exigencies intrinsic to such care, make the delivery of care in the ICU distinct from delivery of care elsewhere. ICU physicians and staff treat the urgent, acute, and often complex problems of critically ill patients; this causes their patterns of practice to differ from those of their counterparts working on a general medical or surgical ward or in an outpatient facility. The NIH Consensus Report discussed this distinction with respect to nursing care:

> Nursing care in the ICU has an emphasis opposite from such care on general services. The effectiveness of the ICU nurse is his or her knowledge of all the details necessary to care for one or two patients while the effectiveness of the general service nurse rests on his or her ability to direct care delivery by others to numerous patients. (1983: 803)

The potential benefit from this type of specialization and division of labor is that providers may be able to use life-sustaining technologies more skillfully and treat acute illnesses more effectively and efficiently.* The potential risk is that the singlemindedness that underlies this style of practice may

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*The extent to which this potential benefit has been or can be

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realized is controversial. The NIH Consensus Conference noted:

> Historically, ICUs were organized to serve specific purposes such as rhythm monitoring, the care of postoperative patients, airway maintenance, and mechanical ventilation for patients with reversible neurological disease. The highly favorable outcomes derived from such specialized care served as the stimulus for establishing large numbers of such units. During the past two decades, the availability of physical resources, nursing staff, and related specialized procedures, as well as the patients' expectations, have resulted in an expansion of the original indications for admission to categories of patients for whom the achievable benefits are less clear. (1983: 799)

The same conference noted that there are three types of patients admitted to ICUs: (1), patients with low probability of survival without intensive care for whom mortality is greatly decreased in ICUs, (2), patients with low probability of survival without intensive care but for whom ICU admission has uncertain, if any, survival benefit, and (3), patients who are at risk for becoming critically ill and who are admitted for monitoring.

Thibault *et al* (1980) studied 2693 consecutive admissions to one medical ICU and found that noninvasive monitroing was the reason for 77% of admissions; of these, only 10% subsequently received major interventions, defined by the authors as respirator therapy, dialysis, invasive hemodynamic monitoring, and other invasive procedures. The 23% of patients admitted for immediate interventions accounted for a disproportionate number (58%) of the deaths during hospitalization. Knaus *et al* (1982) found that illness severity of ICU patients differed markedly in five university hospitals, indicating that ICUs played different roles and presumably used different admission criteria in each institution.

Some ICU patients are probably so moribund upon admission that no medical treatment could improve outcome; others (e.g., some of those admitted primarily for monitoring) probably never need intensive care at any point during their hospital stay. Neither type of patient will benefit from ICU care and the function of admission criteria should be to screen out such patients. Unfortunately, the rapid expansion of availability and indications for ICU admissions occurred before admission criteria based on controlled studies of efficacy could be developed; for many conditions, admission to an ICU became "standard medical practice" before it was shown to be effective medical treatment. Gregory, himself an intensivist, has commented:

> One major deficit is our [intensivists'] inability to prove that what we do improves patient outcome, and it is worthwhile. Like many things in medicine, most of critical care arose as someone's good idea. They studied 5 patients,

adversely affect the decision-making processes of ICU personnel by distorting their perspective on the patient, that is, by causing them to look primarily at the patient's acute illnesses in terms of potential reversibility and not at the patient's overall condition in terms of potential function and quality of life. This last point will be considered further in the section on treatment selection.

Technology-Independent Expertise

In addition to technology-specific expertise, there is also a

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> published the data, and we all rushed to use this new therapy. It soon became a standard of care without proof that it worked. As an example, we made up the number of square feet we needed per bed in the Intensive Care Nursery, and the number of electrical, oxygen, and air outlets needed per bed. We did this to get more space from the hospital. Others thought these ideas sounded good. The next thing we knew, these were the recommendations of the Academy of Pediatrics and the law in 39 states.
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> . . . . There is no controlled trial for most of what we do. There is no controlled trial showing that mechanical ventilation is better than no ventilatory support for patients with respiratory failure. We all believe that it is, but we cannot prove it . . . . (1983: 767)

Ironically, it now may be difficult to perform randomized clinical trials to determine rational admissions criteria; many physicians may be unwilling to withhold "standard medical practice" from their patients in the control groups of such studies.

ICU admission criteria are vague and difficult to define through retrospective reviews. The few studies that exist regarding the efficacy of ICU treatment have not been able to address these problems. For example, when Hook _et al_ (1983) studied mortality due to pneumococcal bacteremia, they concluded that the availability of ICUs had not reduced overall mortality based on comparisons with survival results taken from previous studies. Unfortunately, the authors did not attempt to prospectively control or retrospectively deduce the criteria for admission or denial of admission to the ICU. Even if one accepts that it is methodologically sound to use historical comparison groups as was done here, it is still unclear whether the results reflect an inability of intensive care to influence outcome or the use of inappropriate admission criteria.

body of knowledge not linked to any technology in particular but which is still relevant to the care of the critically and terminally ill elderly. Part of this technology-independent expertise relates to specific clinical differences between geriatric and other adult patients, such as atypical patterns of disease presentation. An additional part of this knowledge pertains to age-related psychological problems of the elderly.

Clinical Expertise

There are a number of illnesses which have unusual presentations or progressions in elderly patients. The presentation may be characterized by specific signs and symptoms which differ from the classic presentation of the illness in adults. For example, elderly patients are more likely to have heart attacks which are not accompanied by chest pain. Instead, they may have other signs and symptoms such as sudden loss of consciousness, confusion, or sudden onset of heart failure. Alternatively, the elderly patient may present with non-specific signs and symptoms which do not clearly indicate the affected organ system. For example, elderly patients may suffer from pneumonia without exhibiting fever, an elevated white blood cell count, or other classic signs; the only manifestations may be non-specific ones such as confusion, lethargy or weakness. (Rowe 1985b; Andres *et al* 1985; Rowe and Besdine 1982)

Physicians must be able to recognize unusual presentations in order to treat patients properly. Nurses must also be aware of these differences in order to detect changes in the patient's condition which require intervention. For example, a change in the patient's mental state may be due to a number of causes such as drug toxicity or infection, and such changes cannot merely be attributed to "aging" or "senility."

In addition to atypical presentations, the elderly are at higher risk than the general population for developing complications of both hospitalization and treatment. For example, the elderly are at greater risk for iatrogenic drug toxicity because they take more drugs than younger patients and because there is great variability among elderly persons in the dosage levels which produce therapeutic and toxic blood levels of many common drugs (Vestal 1978). The elderly are also more likely to develop pressure sores in the hospital than are younger patients. Because these problems may be severe and potentially even fatal, expertise in their prevention and treatment is important in the care of the critically and terminally ill elderly. Even though the patient may be faced with an acute problem which is immediately life-threatening (e.g., respiratory insufficiency) and requires the use of sophisticated technology (e.g., ventilator support) as the primary mode of treatment, physicians and nurses must also take appropriate measures to prevent iatrogenic complications. (Andersen *et al* 1982; Reuler and Cooney 1981; Steel 1984b; Trunet *et al* 1980))

Psychological and Other Problems Related to Aging

There are a number of psychological problems which, while not unique to the elderly, occur more frequently in elderly populations. Two of the most common problems are cognitive dysfunction (confusion) and depression.

Cognitive dysfunction may be defined broadly as impairment of intellectual processes or functioning. It may be caused by a primary dementia, such as Alzheimer's disease, or by delirium secondary to drug toxicity, medical illness such as pneumonia, or physiologic impairment in sensory systems such as hearing and vision. Delirium has a number of reversible causes and requires careful evaluation. Dementia (a heterogenous group of illnesses characterized by irreversible, primary cognitive dysfunction) is more prevalent in elderly than in younger age groups and is one of the most common types of cognitive dysfunction seen in the elderly.

Like younger adults, the elderly also suffer from endogenous depression; however, the elderly also frequently suffer from reactive depression secondary to personal losses common in old age--declining health and ability to function independently, death of spouse, relatives, friends, etc. (Andres *et al* 1985; Rowe and Besdine 1982; IOM 1978)

Although the psychological problems of the elderly are diverse in their causes, manifestations, and amenability to treatment, cognitive and affective dysfunction in the elderly is sometimes merely labelled with non-specific terms such as "senility" and not investigated or treated further. In order to provide optimum care, physicians and nurses who treat the elderly must be aware of these common psychological problems; be able to distinguish among them (e.g., differentiate between cognitive impairment due to

Alzheimer's disease and impairment due to medical illness or depression) or to obtain appropriate consultation for this purpose; and be able to select and administer the treatment which will provide the greatest improvement in function.

While it may seem self-evident that providers who care for the overall needs of the elderly on a continuing basis should have expertise in psychological problems of the elderly, it is less apparent whether providers of intermittent care such as ICU personnel, who treat patients only when they have or are at risk for developing immediately life threatening illness, also need to possess this expertise. When the primary goal of treatment is alleviation or prevention of acute, life threatening illness, expertise in psychological problems may not seem vital or necessary to achieve this goal. In practice, however, this expertise may be critical in the care of the seriously ill elderly in ICUs.

Knowledge of prevention and treatment of psychological problems improves the ability of providers to deliver life-sustaining treatment. Psychological expertise on the part of caregivers can effect improved patient mental functioning, thus enabling cooperation with treatment and participation in decision-making. It is far easier and safer for providers to administer treatments such as dialysis or mechanical ventilation to a cooperative, lucid patient than to a disoriented, combative one who continually attempts to remove his or her intravenous, nasogastric and tracheostomy tubes. Patients with improved mental functioning can communicate information to providers about symptoms they are experiencing which will assist in early detection of complications. They are also better able to understand and evaluate proposed treatments, and to express their expectations and preferences regarding these treatments.

Psychological expertise is particularly important in elderly populations as they are at greater risk for developing new cognitive and affective problems as well as exacerbations of existing problems while critically ill. Admission to an ICU is in itself a risk factor for developing certain types of cognitive dysfunction; this risk is often greater for elderly than for younger patients. Psychiatrists and others have described a phenomenon termed "ICU psychosis," referring to a fairly common occurrence wherein the stress of being an ICU patient induces a temporary psychosis akin to "combat fatigue" or "shell shock" in soldiers (Simon and Pardes 1981; Kaplan and Sadock 1981; Katz *et al* 1972; Hackett *et al* 1968). Elderly persons who are functional outside the ICU may have less reserve to tolerate the additional stress engendered by illness and ICU admission and thus be more likely to develop this iatrogenic condition.

The same stresses may also contribute to the etiology of other types of impairment, as well as to worsening of preexisting impairment. For example, many mildly demented patients who have only slight cognitive impairment may become more disoriented, confused, and even combative when faced with severe illness and a foreign environment (the ICU). Proper management of demented patients can ameliorate or prevent these types of complications.

Psychological expertise is useful not only for physicians, but also for nurses and certain other personnel who provide care in the ICU (i.e., those who spend extended periods of time providing direct patient care). Because these providers spend more time with the patient than the physician, they may be able to recognize problems at an early stage, exert a greater influence over the patient's subjective experience, and provide the patient with considerable assistance in coping with this stress. (Fisher and Moxham 1984; Taylor 1971)

Over the last decade, nurses have done much to define and systematize psychological expertise by developing nursing diagnostic categories to identify and classify many types of patient problems related to coping and stress and nursing management techniques to assist patients with these problems (Kim and Moritz 1982; Kim *et al* 1984).

BRINGING EXPERTISE TO BEAR

In the previous section, the technical expertise associated with the use of life-sustaining technologies for the critically and terminally ill elderly was discussed. In this section, the criteria and methods for determining when and how this expertise may best be applied will be considered.

Treatment Selection Decisions

There are at least two distinct steps in the process of selecting a treatment which will be recommended to patients. The first is to assemble a data base, and the second is to apply substantive criteria to the data base to choose the treatment alternative most consistent with the criteria.

Substantive criteria are rules which derive from and are intended to promote more general goals such as preserving life, improving function, or protecting autonomy; they are used to select a treatment from among the alternatives. The data base is the set of medical facts which the decision-maker relies upon when he or she determines which treatment alternative is most consistent with the substantive criteria.

The data base should contain all of the information which is material to the treatment decision. This includes the nature of the patient's condition; the nature and purpose of the recommended treatment; the likelihood and nature of the benefits and risks associated with treatment; and the risks and benefits of alternative treatments, including no treatment. Once the data base is collected, the decision-maker evaluates each treatment alternative using a preselected set of substantive criteria.*

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*There is a body of literature which advocates the use of decision analysis methods to make the application of substantive criteria in medical decision-making more systematic so that decisions will be consistent with substantive criteria and rationally related to goals. Possible outcomes of each treatment decision are assigned both a utility (desirability) rating and a probability coefficient. The product of these two figures represents the value of the outcome. The values for the potential outcomes of each treatment are summed and the treatment with the highest value is chosen. (See e.g., Eraker and Politser 1982 and Kassirer 1976) Decision analysis techniques have not been widely adopted by the medical profession. Kassirer has observed that:

> most of the energy expended in the education of medical students and house officers is directed into teaching a huge

The data base derives from a body of knowledge which is esoteric and generally inaccessible to laymen; consultation with health care experts is necessary to obtain the data. Substantive criteria derive from principles which are neither esoteric nor inaccessible to non-professionals. Thus, while constructing a data base requires use of expertise, evaluating the data base to select a treatment to recommend to patients does not.*

> body of facts and methods for gathering and interpreting data; little or no attention is given to the principles that underly clinical decision making. In fact, the principles of decision making are often obscured by the substitution of established protocols (1976: 149)

On its face, decision analysis may seem capable of providing what Kassirer calls "rational decisions that lead to optimum therapeutic outcomes (1976: 149)." To the extent that treatment desirability may be assessed on a linear scale (see footnote on pp. 36-37 regarding the limitations of linear assessments of multidimensional concepts), the technique may actually be useful for selecting the treatment alternative most consistent with preselected substantive criteria, but it cannot aid the decision-maker in the selection of those criteria. In its application, decision analysis will at best produce results that are as "rational" or "optimum" as the substantive criteria that are used.

*See Friedson 1971 for a good discussion of the role of the expert in decision-making.

Courts have also distinguished between the expert and non-expert aspects of decision-making. In a leading informed consent case, the California supreme stated:

> A medical doctor, being the expert, appreciates the risks inherent in the procedure he is prescribing, the risks of a decision not to undergo treatment, and the probability of a successful outcome of the treatment. But once this information has been disclosed, that aspect of the doctor's expert function has been performed. The weighing of these risks against the indvidual subjective fears and hopes of the patient is not an expert skill. Such evaluation and decision is a nonmedical judgment reserved to the patient alone. (Cobbs v. Grant 1972 at 243)

Much of the medical literature regarding disclosure and informed consent does not make the distinction between the expert and non-expert aspects of decision-making. See, e.g., the second footnote on p. 43 and references cited in the accompanying text.

Substantive Criteria for Treatment Selection: Traditional, Geriatric, and Patient Criteria

The substantive criteria for treatment selection derive from the goals of the health care system. Some of these goals are chosen by members of the system, whereas others are imposed upon the system by non-members such as legislatures, courts, and third party payors.

As was discussed previously, the traditional goal of medicine was the cure of acute illness. Treatment efficacy was defined as the ability to prolong life, and the treatment with the best case-fatality rate, five year survival, or other measure of longevity became the medical treatment of choice. Geriatricians have argued that these goals are too narrow and inappropriate for use in geriatric populations which suffer largely from chronic and incurable disease. Instead, improvement of function and quality of life should be the goals of health care for the elderly as these goals are more realistic and often perceived by patients as having greater importance. "Function" and "quality of life" are more complex concepts than prolongation of life; they are also more ambiguous in meaning and more difficult to assess.

Society imposes a number of goals upon the medical care system. Some of these relate to the provision of care which is not standard medical care (e.g., standards for human research), while others are directed at the system as a whole rather than at the care of individual patients (e.g., cost-containment).* More importantly for individual decision-making, society has also chosen to impose standards on the physician-patient relationship through the legal doctrine of informed consent.

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*Since this report is limited to consideration of the

The primary purpose of this doctrine is to protect patient rights of autonomy and self-determination by providing patients with sufficient information and power to determine for themselves what is in their own best interest.* Under the doctrine, physicians have an obligation to obtain informed, voluntary, competent and understanding consent prior to administering medical treatment; failure to obtain valid consent is treated as negligence. (Annas _et al_ 1981; _Cobbs v. Grant_ 1972; _Canterbury v. Spence_ 1972; _Harnish v. Children's Hospital_ 1982) Two consequences of informed consent law are that physicians must disclose information material (relevant) to a treatment decision** (risks, benefits, alternatives, etc.) and that patients may refuse recommended treatments When the patient is incapable of giving

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expertise related to the provison of standard medical care to individual patients, neither of these will be addressed further. It may be argued that cost-containment policies will affect decision-making for individual patients by defining what treatments will be available to choose from; however, the purpose of this section of the report is to define the criteria providers use to select a recommended treatment from the available treatments.

*Annas _et al_ have pointed out that a secondary purpose of the doctrine is to promote, though not require, rational decision-making (1977).

**Even when patients decline treatment, the physician still has an obligation to disclose information material to the treatment decision so that the patient may make an informed choice (_Truman v. Thomas_ 1980). There are certain exceptions to the disclosure rule, e.g., in emergencies, if the patient waives his or her right to disclosure, etc. See Meisel 1979 and sources cited in text, _supra_.

consent (i.e., he or she is incompetent), a surrogate decision-making process must be used.*

In many cases, patients have the same goals as physicians and willingly consent to therapy designed to achieve these shared ends; some patients even prefer to defer to their physician and allow him or her to make decisions in their best interest. Occasionally, conflicts arise when patient and physician disagree as to what is in the patient's best interest; under the informed consent doctrine, the patient's opinion is definitive in such cases.

The integration of principles of autonomy into the decision-making process has not been fully accepted by the medical profession. Although some physician authors have been respectful of patient wishes (see, e.g., Wanzer et al 1984; Angell 1984), others have argued against patient participation in medical decision-making by claiming that patients are incapable of making treatment decisions,** that informed consent is inconsistent with

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*The standard used by most courts in such cases is the "substituted" judgment test wherein the surrogate attempts to make the same decision the patient would have made if he or she were competent (Annas et al 1981; President's Commission 1982 and 1983; Matter of Quinlan 1976; Superintendent v. Saikewicz 1977). When it is not possible to determine the patient's wishes (e.g., the patient has never been competent), then a "best interest" or objective standard is frequently used. Under this standard, the surrogate makes the decision which is in the patient's best interest; this decision is generally defined as the alternative most reasonable people would choose when faced with the patient's situation. Presumably, most reasonable people favor one or more of the goals used by the medical profession: prolongation of life, improvement of function, or improvement of quality of life.

**In a frequently cited article, Ingelfinger (1972) says the problem with informed consent to human experimentation is that is medical realities, and that it is unethical to allow patients to make "irrational" choices (i.e., choices different from those obtained using solely medical criteria) (see, e.g., Appelbaum and Roth 1983; Lidz *et al* 1983; Appelbaum *et al* 1981; Culver *et al* 1985). Some studies have indicated that treatment choice often reflects physician authority rather than patient wishes, and that physicians may often fail to include consideration of patient wishes when selecting treatment (Appelbaum and Roth 1983; Lidz *et al* 1983; Bedell and Delbanco 1984).

Because there is room within the concepts of function and quality of life to include consideration of the patient's desires, the geriatrician's approach to decision-making may be better suited to promoting patient autonomy and patient satisfaction than approaches used by physicians with other professional backgrounds. The American Geriatrics Society recently articulated standards for decision-making while discussing the case of Claire Conroy, an octogenarian nursing home resident who suffered from gangrene of her left leg, multiple skin ulcers, and contractures of her extremities. She was unresponsive to all but noxious

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is an uneducated consent and hence without understanding. Other authors have used a similar argument in the non-experimental context to conclude that patients cannot meaningfully understand the treatments to which they consent because they have not been trained in the medical sciences. The latter argument confuses technical knowledge necessary for the practice of medicine with that needed for medical decision-making. Disclosure cannot make patients as knowledgeable physicians, but it can give them sufficient understanding of the risks and benefits of alternative treatments so that they may determine where among the treatment options their interests lie.

stimuli, was unable to eat on her own, and was receiving artificial feeding through a nasogastric tube. Her nephew and guardian claimed Ms. Conroy would have wanted treatment discontinued and petitioned for a court order to have the feeding tube withdrawn when the nursing home and a physician refused to terminate treatment.

In an *amicus curiae* brief submitted to the supreme court of New Jersey (Lynn 1984), the Society took the position that competent persons may decline any treatment and "need give no convincing reason for their own choices (917)." In regard to surrogate decision-making, AGS said that "medical intervention should be undertaken only when expected to improve the patient's well-being (917)." The Society said that in addition to prolongation of life, an assessment of well-being should include consideration of the burdens of treatment, the potential for improvement of disability, and the potential for symptom control. Finally, AGS said that decisions made by surrogates should, when possible, reflect the preferences of the patient.

Life Sustaining Technology: Problems With the Data Base

When physicians make recommendations regarding whether to initiate or discontinue life-sustaining technology, difficulties often arise as a result of uncertainty regarding what will happen in a particular case. The possible benefits and risks of treatment may be known, but the actual outcome of treatment may be difficult to determine. This is so partly because there is often little or no scientific basis upon which to predict the likely course of the patient's illness. It is also partly due to a lack of data regarding treatment efficacy: although life-sustaining technologies have become "standard medical treatment" for many conditions and illnesses, the efficacy of many of their common applications has never been evaluated systematically; data on the therapeutic value of these technologies for elderly patients is particularly lacking. Similarly, the potential harm which may be caused by use of life-sustaining technologies has not been well quantified; the work of Steel _et al_ (1981), which concluded that a significant amount of iatrogenic illness resulted from admission to a general medical ward, suggests that the risks associated with these technologies may be considerable. The result of these gaps in the data base is that there is often no systematic method of determining either the need for intervention or the likely outcome of treatment.*

Difficulty also arises due to the fact that physicians make decisions for individuals while studies gather information applicable to populations. It may be known, for example, that without dialysis, a patient with end-stage renal disease and other serious chronic illnesses will die within a brief period of time; and it may be known that for the large majority of patients with similar medical conditions, dialysis would provide little or no improvement in survival or function. Hence, it may be concluded that overall, dialysis offers no significant benefit to the group of patients with medical problems similar to the patient in question; however, it is not known whether this particular patient will be the unusual one who will benefit substantially from treatment. This leaves the physician with a difficult choice: if treatment is as a rule not offered in such situations, then a pattern of decisions will emerge which provides appropriate treatment for most patients but not necessarily for the patient in question. Alternatively, if treatment is as a rule offered out of hope (or fear) that the patient in question may be the rare patient who will benefit, then most of the population will be subjected to useless treatment for the benefit of a few individuals.

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*Wasson _et al_ (1985) define clinical prediction rules as a set of rules derived from systematic clinical observations which are used to make predictions based on clinical findings. They can be used to identify which patients require diagnostic tests, treatment, or hospitalization. In the article cited above, the authors review 33 articles describing clinical prediction rules for methodological soundness. They concluded that 58% of the published rules contained an inadequate description of the patient population from whom the rules were derived, of the setting in which the rules were derived, or of the rules themselves.

See also the related footnote on pp. 30.

Physicians make decisions for individual patients and not groups of patients; one might therefore expect that they would be more likely to recommend treatment when faced with uncertainty regarding the value of treatment. Anecdotal and indirect evidence support this conclusion. In a recent article about treatment of chronic renal failure, Freeman wrote:

> Not infrequently, patients have serious impairment of organ systems other than the kidney, but since it is not always possible to predict how much benefit they will derive from dialysis, treatment is instituted even though the outcome is uncertain (1985: 579).

Jennett (1985) has written that "The deployment of skilled personnel and sophisticated technology in treating patients that do not benefit is usually explained (or excused) on the grounds that prognosis is uncertain." In addition, Jennett observes, once technological intervention is initiated, it is difficult to discontinue because the physician feels "committed" to treating the patient.

Studies on health care utilization provide indirect evidence that physicians tend to give rather than withold or terminate treatment when they are in doubt. By far the greatest per capita expenditures for health care of the elderly are made on patients who are in their last year of life (Lubitz and Prihoda 1983). Campion _et al_ (1981) found that elderly patients were more likely to receive major life support interventions but less likely to survive than younger patients when admitted to an ICU.* Youngner _et al_ (1985) found that 14% of patients admitted to a medical ICU were designated "do not resuscitate" ("DNR") either before or during their ICU stay. The DNR patients consumed more resources than non-DNR patients both before and after they were designated DNR, even when non-DNR patients admitted primarily for monitoring were excluded from the comparison. When patients who were receiving life-sustaining treatments such as ventilators were designated DNR, the treatments were almost never subsequently discontinued.

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*The authors defined major interventions as intubation, respirator therapy, cardioversion, cardiopulmonary resuscitation (CPR), dialysis, transfusions of more than five units of blood, pacemaker placement, or arterial catheterization.

Part of the increase in utilization of services by elderly patients prior to their death is due to the fact that persons near death simply have an increased need for services. However, at least some of the increased utilization may be due to the use of interventions of uncertain efficacy which only marginally affect outcome, particularly in acute and intensive care settings.

The Treatment Selection Process

There is surprisingly little medical literature which defines the process used by physicians to deliberate and arrive at decisions. Articles in medical journals which discuss the decision-making process generally propose theoretical models rather than define current practice. Procedural issues such as which of the involved physicians have an influential or controlling role in most decisions, who actually participates in decision-making, and what steps are followed during the deliberative process, have not been addressed in the medical literature. This dearth of information makes it difficult to make definitive statements about physician decision-making behavior; however, certain provisional conclusions may be inferred from literature which relates indirectly to this subject.

The Influence of Professional Training

There is a wide range of discretion in acceptable medical practice in the United States (Wennberg *et al* 1980); there is also great variation in medical practice between the United States and other developed countries. It seems reasonable, therefore, to expect that a physician's professional training might be a factor which influences decision-making by affecting both the nature and completeness of the data base and the choice of substantive criteria. Unfortunately, there are no controlled studies which compare decisions made by physicians to determine if there are systematic differences in decision-making associated with differing specialty experience. Conclusions regarding the influence of the physician's background may be inferred from non-systematic accounts and studies which provide indirect data about physician decision-making behavior. In this section, differences between physicians with backgrounds in critical care and in geriatrics will be discussed.*

The primary function of intensive care is to maintain homeostasis and support failing organ function to prevent death from life-threatening illness. As was mentioned earlier, the exigencies and narrowly circumscribed goals of critical care medicine alter the nature of medical practice; they may also distort the perspective of physicians during the decision-making process. Observers have alluded to the potential for ICU patients to be viewed as biological systems to which technologies may be applied. One intensivist has commented that:

> Much of current medical practice operates tangentially to the goal of a happy and productive life. The ICU is

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*Unit directors of medical ICUs are most frequently physicians originally trained in general internal medicine and one of its subspecialties such as cardiology or pulmonary medicine who subsequently developed interest and accumulated experience in critical care medicine. (Greenbaum 1984)

> particularly susceptible to tangential practices. Measurements and monitoring are frequently pursued as ends in themselves. Patients are transformed into physiological preparations as the norm of practice. The life and death atmosphere of the ICU does not lend itself well to deliberate analysis. Overly aggressive management is pursued in the moderately ill patient, because this is the way the the most critically ill are managed. (Robin 1983: 144)

The danger of such a perspective is that it may create a technological imperative. If the goal of critical care medicine is seen primarily as maintenance of biological function, then the decision-making process may be reduced to a determination of whether parameters of organ function may be stabilized or brought closer to an equilibrium state by technological intervention. The data base selected for decision-making will consist of information related to this determination and may omit consideration of overall probability of survival or return of function or quality of life. Technologies may be applied because they are available and not because they will improve outcome.

The data on utilization and outcome cited in earlier sections of this report (Thibault _et al_ 1980; Hook _et al_ 1983; Lubitz and Prihod 1983; Campion _et al_ 1981; Youngner _et al_ 1985) are indirect evidence that some ICU patients, and particularly elderly patients, receive treatments which do not improve outcome. Unfortunately, it is not possible to determine from these studies which of the involved physicians (the ICU unit director, the attending physician, consulting subspecialists, house officers, etc.) participated or were influential in decisions to recommend treatment.

The decision to admit the patient to the ICU, like other patient care decisons, is usually considered the legal and professional responsibility of the patient's attending physician, frequently a primary care physician such as an internist or family practitioner. Presumably, the attending physician makes this decision himself or in consultation with a subspecialist such as a cardiologist or pulmonologist. Following admission, the unit director or other unit staff physicians may play a variable role in decisions concerning commencement or continuation of treatment. Frequently, the attending physician outside the ICU remains the attending physician and the person ultimately resposible for decisions when the patient is in the ICU. In some ICUs, the unit director or a physician on the unit staff is required as a matter of hospital policy to be a consultant in admissions and treatment decisions. Some units even require that an ICU physician become the attending physician while the patient is in the unit; most often, this practice is employed when the primary care physician is a family practitioner as these physicians have less formal training in critical care medicine than do internists.

Although there is no systematic data regarding how geriatricians make decisions regarding life-sustaining technologies, there is some evidence to indicate that they behave differently than other physicians, particularly those with backgrounds in critical care. As was described earlier, geriatricians are more likely to make decisions aimed at improving outcome in terms of function and quality of life and to be respectful of the patient's own wishes. One might expect, therefore, that geriatricians would be less likely to recommend treatments of uncertain value, especially when treatment is unlikely to influence outcome.

The geriatrician might potentially improve decision-making and patient care in the ICU by acting not only as a primary care physician but also as a consultant to other physicians. He or she might be able to provide a more complete data base for decision-making in the ICU; in addition, he or she may be more skilled at recognizing and interpreting unusual clinical presentations than other physicians, as well as more experienced in the evaluation and management of cognitive and affective changes frequently seen in the elderly.* As primary care physicians, geriatricians would most likely be better acquainted with patient value systems and personal preferences than intensivists who see patients for the first time in the ICU.

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*Rubenstein et al (1984) have reported that on follow up after discharge, elderly patients treated in their inpatient VA hospital geriatric evaluation unitifying (GEU) showed improvement in outcome measures such as mortality, functional status, hospital readmissions, and nursing home days when compared with controls. This GEU had specific exclusionary standards (e.g., well-diagnosed dementia or other disease resistant to medical treatment in patients who could perform no more than three activities of daily living or who had no social support) designed to select only those patients thought to be most amenable to treatment.

Other GEUs using different admission criteria and treating different patient populations have reported varying degrees of success. See, e.g., Lefton et al 1983; Teasdale et al 1983; Campion et al 1983; Saunders et al 1983.

Overall, the results reported by GEUs seem to indicate that specialized geriatric care can provide improved assessment, management, and outcome in certain subgroups of geriatric patients.

The Nursing Data Base and Treatment Goals

Over the last decade, nurses have devised systematic methods for assessing patients and classifying them into nursing diagnostic categories; this data base is then used to design a nursing treatment plan. Although these classification and treatment schemes have not been universally adopted by the nursing community, authors in the nursing literature have argued that the nursing data base and treatment plans are distinct from their medical counterparts and that their use is essential to good care. (Kim *et al* 1984; Kim and Moritz 1982; Gordon 1982)

The nursing data base is comprised of information about the patient's physical signs and symptoms as well as his or her physical, cognitive, and affective functioning. Functional assessment is a central component in many nursing diagnostic categories: for example, activity intolerance, dysfunctional grieving, and impaired mobility have all been approved as nursing diagnoses by National Conferences on Classification of Nursing Diagnoses. (Kim *et al* 1984; Kim and Moritz 1982; Gordon 1982; Panicucci 1983) These diagnostic categories are used to identify problems which are amenable to nursing management.

Treatment delivered by nurses consists largely of the use of nursing skills to carry out medical treatment prescribed by physicians. However, nurses are also be able to select and administer treatment for certain types of psychological and physicial discomfort and dysfunction which do not require physician intervention. For example, in the acute or intensive care setting, nurses may independently institute measures to treat impaired mobility, such as encouraging and assisting ambulation or bed to chair transfers. Techniques designed to alleviate ICU stress, such as frequent orientation of patients to time, place and person, may be administered without need for physician supervision.

In the critical care setting, nurses with geriatric experience and training may be able to more fully address functional and psychological problems in elderly patients. Some geriatric assessment units which have employed physicians and nurses with geriatric experience to treat patients in acute care wards have been able to improve functional status in certain patients at discharge; this in turn resulted in less frequent discharge of these patients to institutional settings.* Geriatric nursing expertise might also be able to contribute to improved outcomes in the intensive care setting.

The Team Approach And The Role of Non-Physicians In Decision Making

Much has been written about the use of a team approach for care of the elderly; it is argued that a team approach is well-suited to such care because the elderly experience medical problems which are diverse and affect a number of systems simultaneously. Teams can potentially draw on expertise from a number of fields to provide comprehensive, coordinated care.

The best known examples of geriatric team care are the geriatric assessment or evaluation units, which have received much attention in the last several years. The authors of reports on the units refer to them as "multidisciplinary" or "interdisciplinary" team efforts; team members include physicians, nurses, and a variable mix of other professionals whose expertise is often relevant, such as physical therapists, dietitians, social workers, and others.* The team approach has been used in other care settings, including the ICU.

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*See footnotes on pp. 53 and 56.

Although there is no uniform model for geriatric or ICU teams, most teams make use of interdisciplinary assessments. When a new patient is referred to the team, each team member examines and assesses the patient with respect to his or her particular field of expertise. Initial assessments are generally followed by treatment planning conferences wherein the team members attempt to reach a consensus regarding which treatments and other interventions are appropriate for the patient.

There are no systematic evaluations of the roles that non-physicians play in team decision-making; narrative accounts of team conferences indicate that non-physician professionals are present at decision-making conferences but do not describe the nature or extent of their contribution. Since physicians bear legal and professional responsibility for most of the decisions that are made, it is likely that they remain the controlling influence in most decisions; ideally, however, non-physician team members can participate in decisions regarding the selection and administration of life-sustaining technologies and even make certain types of decisions independently.

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*For descriptions of of geriatric assessment units and the results of attempts to assess their effectiveness see, e.g., Rubenstein _et al_ 1982; Rubenstein _et al_ 1984; Lefton _et al_ 1983; Teasdale _et al_ 1983; Williams _et al_ 1973. See also the footnote on p. 52.

Each team member can provide valuable information derived from his or her assessment to the data base used for determining what treatment will be offered to patients. Some of this information will be derived from the team member's technology-specific expertise. For example, a dietitian may provide information about a critically ill patient's nutritional state which can be used to determine whether artificial feeding is indicated. Other information will be derived from technology-independent expertise. For example, because they spend more time with patients and provide more direct patient care, ICU nurses may be better able to assess patient coping skills and response to stress than other team members; they may also be better acquainted with the patient's treatment preferences. This information can be used to select and plan treatment accordingly.

Once treatment has been selected, non-physician team members may also make certain patient management decisions which do not require physician intervention. For example, nurses who administer dialysis are trained to recognize and manage certain complications such as hypotension without physician intervention. As was described previously, nurses also manage many problems relating to psychological and physicial comfort independently.

When teams function properly, they can have many beneficial effects on patient care. Treatment selection decisons can be based on a more comprehensive data base than might otherwise be possible. Treatment plans of physicians, nurses and other personnel may be coordinated to ensure that all necessary treatments are delivered and that duplication of provider efforts does not occur.

Teams can also facilitate sharing of expertise among providers. For example, a physician may determine that an elderly patient requires major abdominal surgery; if that patient is also malnourished, improvement of nutritional status prior to the surgery may also improve operative outcome. In a team setting, the physician has regular contact with team members and may present the patient to them and draw upon their expertise. Nurses and dietitians familiar with the patient may suggest a change of diet to foods the patient prefers and will be more likely to ingest orally. The dietitian may advise the team as to whether improvement in oral intake will be sufficient to improve nutritional status in the amount of time remaining prior to the surgery. He or she may then suggest artificial feeding regimens which would be able to improve nutritional balance in the time available.

Non-physicians can also share expertise in team settings. For example, nurses who have questions relating to airway maintenance and pulmonary hygeine of an elderly patient on a ventilator may draw upon the expertise of respiratory therapists who are team members. Nurses caring for patients with disturbed gastrointestinal motility who are receiving enteral feedings may ask dietitians for suggestions on improving patient tolerance of therapy.

The potential pitfall of team care is that teams may be inefficient. If the contribution of each provider to the data base is not clear, team planning conferences may become bogged down with the presentation of redundant information. Teams which do not establish clear lines of decision-making authority and attempt to make decisions by consensus may have difficulty making decisions. Teams with a large number of members are particularly susceptible to these problems. Commenting on geriatric assessment units, Rubenstein has noted that problems with the team approach may be avoided by carefully defining member roles. In his words:

> It has become almost a watch word of GAUs [Geriatric Assessment Units] to talk about team care, but less has been said about the size and interdisciplinary composition of the core team. Teams may be very expensive and potentially inefficient. The solution appears to lie in using as small a core team as possible and mobilizing a variety of adjunctive specialists when appropriate. (1982: 515)

GERIATRIC TRAINING AND CREDENTIALING

In this section, the history and current state of geriatric training and credentialing, as well as planned changes to the present system, will be discussed. In the following concluding section, speculation as to the likely impact of these changes will be offered.

Licensure and Certification

In order to practice medicine, nursing and certain allied health professions, practitioners must obtain a governmental license. Licensure is a matter of state law and may be carried out differently in different jurisdictions.

Most states require physician applicants for licensure to complete one year of clinical training (i.e., an internship) subsequent to graduation from medical school and to pass a standardized test such as the National Board examinations or the Federation Licensing Examination (FLEX). (Annas et al 1981) Nurses are licensed either as a registered nurse (R.N.) or a licensed practical nurse (L.P.N.). Most states require R.N.'s to be graduates of nursing schools which offer diplomas, associate degrees, or baccalaureate degrees and to pass a national exam such as the National Council Licensing Exam for registered nurses (NCLEX-RN). L.P.N.'s generally must graduate from schools of practical nursing and pass the National Council Licensing Exam for practical nurses (NCLEX-PN).

Certification is a non-governmental mechanism for professional credentialing and self-regulation. Certification is granted by professional associations and is intended to identify those practitioners who have met special standards of professional competence in a particular area. Certification is not a requirement to practice medicine or nursing; however, hospitals may use certification status as a standard in their staff privileges and nurse hiring practices.

Physician Certification

Physician certification in most specialties is controlled by the Accreditation Council for Graduate Medical Education (ACGME).

In order to become certified in a specialty or subspecialty, physicians must pass a standardized test; in order to be allowed to sit this exam, they must first complete an accredited post-graduate training program in the relevant discipline.

The ACGME has established a number of Residency Review Committees (RRCs) which either make recommendations to the ACGME regarding accreditation of a particular postgraduate training program (i.e., whether the program meets ACGME standards) or make accreditation decisions themselves. The certification exams are administered by the American Board of Medical Specialties (ABMS). There are nine specialty boards under the ABMS which certify physicians; most certifying boards also certify physicians in subspecialties of their discipline. The American Board of Internal Medicine (ABIM) and the American Board of Family Practice (ABFP) certify physicians in internal medicine and family practice respectively. The ABIM certifies a number of subspecialties of internal medicine such as cardiology, gastroenterology and hematology. Family practice is considered a generalist field and the ABFP does not offer subspecialty certification. (AMA 1985; Steel 1984a)

There has been much debate about what credential, if any, should be created to recognize competence in geriatric medicine. In 1978, the Institute of Medicine prepared a report entitled Aging and Medical Education.* The Institute noted that medical care of the aged was not adequately covered in graduate and postgraduate medical education. The report recommended that geriatric content be incorporated into existing preclinical and clinical medical school curriculula, and into postgraduate training programs. It recommended against the creation of specialty certification in geriatrics based on the following rationale:

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*A summary of the full IOM report was published in the New England Journal of Medicine by Dans and Kerr in 1979.

> The [IOM] committee agrees with the American Geriatrics Society and other groups that have recommended against a board-certified specialty. It believes that the care of the aged should be the responsibility of appropriately trained primary care physicians. Furthermore, the committee is concerned that if geriatrics were to be a practice specialty, pressure for tens of thousands of such specialists would occur. This could draw attention, energy, and resources away from the needed improvements in the numbers and training of those nurses, nurse practitioners, and allied health personnel who are so essential to the day-to-day care of the aged. Furthermore, it might suggest a medical solution to a largely social problem for which community groups in concert with the aged and their families can provide a large measure of the necessary services.

The IOM report did recommend that mechanisms such as special traineeships and awards be implemented to foster the training of a small number of academic geriatricians necessary for teaching, research and specialized patient care consultation.

Other professional associations such as the Association of American Medical Colleges (AAMC) and the Federated Council for Internal Medicine (FCIM) have opposed the creation of a specialty certification in geriatrics (FCIM 1981; Swanson 1979). Both the AAMC and the FCIM believe that the elderly should be cared for by primary care physician and that the role of specially trained geriatricians should be academic in nature. In contrast, a 1980

Rand report (Kane _et al_ 1980a*) took no position on the issue of board-certification but did argue that physicians with geriatric training should provide primary care for the elderly. The report asserted that "Improving care requires the leadership and active presence of geriatricians in the community as well as in the academic centers (29)."

In 1985, the ABMS authorized the ABIM and the ABFP to offer certificates of added competence in the area of geriatrics. Both boards emphasized that they will not be creating new subspecialties but rather will be creating a mechanism for recognizing merit and achievement in special areas of internal medicine and family practice. Both boards hope to offer the exam for the first time within the next two to three years.

Although officially not a subspecialty, geriatric certification resembles subspecialty certification in many ways. To become certified, applicants will be required to pass a standardized test. In order to sit the ABIM test, they will be required to have board-certification in general internal medicine, and to have completed either a geriatric training program, an appropriate advanced general medicine training program, or be four years post general medical training. Subspecialists will need only one additional year of training. Appropriate training will be required to sit the ABFP exam. Training programs will be evaluated and accredited by the RRCs for internal medicine* and family practice; at the present time, the American Geriatrics Society is developing standards for geriatric training programs which may be adopted by these bodies.

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*A summary of the Rand report was published in the _New England Journal of Medicine_ (Kane _et al_ 1980b).

*The RRC for internal medicine is also encouraging inclusion

Nursing Certification

The American Nursing Association (ANA) offers certification in seventeen areas. Two of these certificates are directly related to geriatrics: a generalist certificate in gerontologic nursing, and a certificate for gerontologic nurse practitioners. The generalist certificate was first offered in the mid-nineteen seventies; to become certified, the applicant must pass a standardized test. In order to sit the test, the applicant must be a licensed registered nurse (R.N.) and must have at least two years of clinical experience in gerontologic nursing. There is no formal system for accrediting the institutions at which nurses receive their clinical experience. In general, institutions are acceptable if a large portion of their patients are elderly;

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of geriatric curricula in general medical residencies. As of September, 1985, RRC standards for residencies in internal medicine stated:

> The patient population in the training program must be representative of the full spectrum of . . . adult male and female medical diseases. The spectrum of patient problems available to the training program must be representative of . . . adult male and female medical diseases.
>
> Rotations on specific geriatric inpatient, nursing home, home-based patients or ambulatory services are desirable when resources and supervision are available. However, even if such facilities are not available, regular experience under appropriate supervision for the in-patient and follow-up care of the elderly is essential.

These standards are scheduled to take effect in June, 1986.

nursing homes are an example of the type of institution which might qualify. The nurse practitioner certificate is offered only to licensed nurse-practitioners who have a master's degree in nursing and who have completed at least nine months or one academic year of clinical and didactic training at a program which meets ANA guidelines.

The focus of the generalist certificate, both in the content of the exam questions and in the eligibility requirements to sit the exam, is long term care of the elderly; competence in the care of the acutely or critically ill elderly is not evaluated. Similarly, nurse practitioner training and testing does not emphasize critical care nursing. The ANA also offers certification in critical care nursing; however the content of test questions and the eligibility requirements indicate that there is no attempt to evaluate competence in the special problems of critical care of the elderly.

SUMMARY AND CONCLUSIONS

There is a great deal of expertise which is relevant to the provision of life-sustaining technologies to the elderly. Some of this expertise is technology-specific and concerned with the actual administration of certain technologies. In theory, technology-specific expertise is applicable to any age group; in practice, however, it is often more difficult and complicated to apply in older patients because of chronic illness and age-related physiologic decline. Another part of this expertise is technology-independent and addresses the unique clinical characteristics and psychological problems of the critically and terminally ill elderly.

Historically, the elderly have been largely ignored in undergraduate and postgraduate training of physicians, nurses and other health professionals. One result of this is that often, as Butler has observed, the physician "treats them [the elderly] as he or she would any forty-year-old patient with the same condition, largely oblivious to the differences caused by age (1978: 287)." Medical and nursing education has been successful in transmitting technology-specific expertise, and the use of life-sustaining technologies has become widespread and common. Physicians, nurses and allied health personnel are able to apply technology but to a large extent are not trained to recognize and manage the unique problems of the elderly.

The omission of geriatric curricula in professional education may affect patient care adversely in that providers may be unprepared to utilize existing medical knowledge to full benefit. It may also adversely affect patient care decisions if physicians rely on an incomplete or inaccurate data base during the treatment selection process. Physicians may recommend that life-sustaining technologies be withheld or, more likely, initiated without full understanding of the relevant medical facts.

The decision-making process is further complicated by problems not specific to the elderly. There is no systematic data regarding either the efficacy or potential for iatrogenesis for many of the uses of life-sustaining technology which are now considered standard medical practice by virtue of their widespread availability and use. In addition, the concomitant rise of critical care medicine and intensive care units has produced a style and setting of care which may foster the use of treatment goals that are insensitive to patient preference and quality of life and which ultimately create a technological imperative.

The recently authorized ABIM and ABFP credentials in geriatric medicine may increase physician interest in postgraduate training in geriatrics and create a demand for the development of more geriatric fellowship programs. They may also provide a stimulus to improve reimbursement for geriatric primary care and consultation which could be used as a source of funding for fellowship programs. These changes may eventually alter the manner in which life-sustaining technologies are applied to the elderly. As the number of physicians who graduate from fellowships in geriatrics increases, the number of academic geriatricians should also rise. This could produce a number of beneficial effects. Research by academic geriatricians may help to improve the data base relating to the use of life-sustaining technologies. Physicians would then be able to better identify the conditions under which such technologies may be of benefit and limit their use accordingly.

Academic geriatricians would also be available to teach geriatric fellows and, just as importantly, to teach medical students and residents in internal medicine, family practice, and other specialties. The latter change will facilitate the integration of geriatric curricula into primary care and other specialty training and may be the most efficient and effective way of improving care of the elderly. Finally, a certain number of fellowship graduates will not enter into academic medicine but will practice in the community. Although their numbers will probably be small for some time to come, these physicians will be able to provide direct primary care as well as consultation for the patients of other community physicians.

Nursing certification in geriatrics is directed primarily at long term rather than acute or critical care nursing. Critical care nursing certification does not include training in geriatrics. Nurses often spend the most time with patients; with appropriate training, they could potentially recognize and assist with the management of problems at an early stage. Nursing education does not provide acute and critical care nurses with this type of knowledge. Because nurses have no formal system for consulting other nurses analogous to the system used by physicians, they cannot gain access to the knowledge of colleagues as easily as can physicians. The lack of geriatric training for acute and critical care nurses is a significant oversight in the current system of nursing education. This omission is particularly disturbing because at the present time, there appear to be no planned initiatives to remedy the situation.

REFERENCES

American Association of Nephrology Nurses and Technicians. "Nephrology Nursing: Standards of Clinical Practice." 1982.

American Medical Association. *1985-1986 Directory of Residency Training Programs Accredited by the Accreditation Council for Graduate Medical Education*. Chicago: American Medical Association, 1985.

American Nursing Association. Cerification. 1985.

Andersen, K.; Jensen, O.; Kvorning, S.; Bach, E. "Prevention of Pressure Sores by Identifying Patients at Risk." *British Medical Journal* 284: 1370-1371, 1982.

Andres, Reubin. "Normal Aging Versus Disease in the Elderly." in Andres, R.; Bierman, E.; and Hazzard, W.; eds. *Principles of Geriatric Medicine*. New York: McGraw Hill, 1985.

Andres, R.; Bierman, E.; and Hazzard, W.; eds. *Principles of Geriatric Medicine*. New York: McGraw Hill, 1985.

Angell, Marcia. "Respecting the Autonomy of Competent Patients." *New England Journal of Medicine* 310: 1115-16, 1984.

Annas, G.; Glantz, L.; Katz, B. *Informed Consent to Human Experimentation*. Cambridge: Ballinger Publishing Company, 1977.

Annas, G.; Glantz, L.; Katz, B. *The Rights of Doctors, Nurses and Allied Health Professionals*. New York: Avon Books, 1981.

Apkom, C. Amechi; and Mayer, Suzanne. "A Survey of Geriatric Education in U.S. Medical Schools." *Journal of Medical Education* 53: 66-68, January 1978.

Appelbaum, P.; Mirkin, S.; Bateman, A. "Empirical Assessment of Competency to Consent to Psychiatric Hospitalization." *American Journal of Psychiatry* 138: 1170-76, 1981.

Appelbaum, Paul; Roth, Loren. "Patients Who Refuse Treatment in Medical Hospitals." *Journal of the American Medical Association* 250: 1296-1301, 1983.

Askanazi, J.; Nordenstrom, J.; Rosenbaum, S.; Elwyn, D.; Hyman, A.; Carpentier, Y.; and Kinney, J. "Nutrition for the Patient with Respiratory Failure: Glucose vs. Fat." *Anesthesiology* 54: 373-377, 1981.

Askanazi, J.; Weissman, C.; LaSala, P.; Milic-Emili, J.; and Kinney, J. "Effect of Protein Intake on Ventilatory Drive." *Anesthesiology* 60: 106-110, 1984.

Avorn, Jerry. "Benefit and Cost Analysis in Geriatric Care: Turning Age Discrimination in Health Policy." New England Journal of Medicine 310: 1294-1301, May 17, 1984.

Barry, Patricia P.; and Ham, Richard J. "Geriatric Education: What the Medical Schools are Doing Now." Journal of the American Geriatrics Society 33: 133-35, February 1985.

Batra, Gretchen. American Geriatrics Society Directory of Geriatrics Programs for Residencies and Fellowships. Updated February, 1985.

Becker, H.; Geer, B.; Hughes, E.; Strauss, A.; Boys In White Chicago: University of Chicago Press, 1961.

Bedell, Susanna; and Delbanco, Thomas. "Choices About Cardiopulmonary Resuscitation in the Hospital: When Do Physicians Talk With Patients?" New England Journal of Medicine 310: 1089-93, 1984.

Brown and Thompson. "Nontreatment of Fever in Extended Care Facilities." New England Journal of Medicine 300: 1246, 1979.

Butler, Robert. "An Overview of Research and the Status of Gerontology Today." Milbank Memorial Fund Quarterly 61: 351-361, 1983.

Butler, Robert. "Public Interest Report No. 27: The Need For Teaching Geriatric Medicine." International Journal of Aging and Human Development 9: 287, 1978.

Butler, Robert; and Lewis, Myrna. Aging and Mental Health: Positive Psychosocial Approaches. 2nd ed. St. Louis: The C.V. Mosby Company, 1977.

Campion, Edward; Jette, Alan;.Berkman, Barbara. "An Interdisciplinary Geriatric Consultation Service: A Controlled Trial." Journal of the American Geriatrics Society 31: 792-96, December 1983.

Campion, Edward; Mulley, Albert; Goldstein, Richard; Barnett, G. Octo; Thibault, George. "Medical Intensive Care for the Elderly: A Study of Current Use, Costs, and Outcomes." Journal of the American Medical Association 246: 2052-56, Nov. 6, 1981.

Canterbury v. Spence, 464 F.2d 772 (D.C. Cir. 1972), cert denied, 409 U.S. 10643.

Carlon, G.; Howland, W.; Groeger, J.; Ray, C.; Miodownik, S. "Role of High-Frequency Jet Ventilation in the Management of Respiratory Failure." Critical Care Medicine 12: 777-79, 1984.

Cobbs v. Grant, 8 Cal.3d 229 (1972).

Comty, Christina; and Collins, Allan. "Dialytic Therapy in the Management of Chronic Renal Failure." *Medical Clinics of North America* 68: 399-425, 1984.

Costa, Paul; and McCrae, Robert. "Concepts of Functional or Biological Age: A Critical View." in Andres, R.; Bierman, E.; and Hazzard, W.; eds. *Principles of Geriatric Medicine*. New York: McGraw-Hill, 1985.

Culver, C.; Couser, K.; Gert, B.; Brody, H.; Fletcher, J.; Jonsen, A.; Kopelman, L.; Lynn, J.; Siegler, M.; Wikler, D. "Basic Curricular Goals in Medical Ethics." *New England Journal of Medicine* 312: 253-56, January 24, 1985.

Dans, Peter; and Kerr, Marie. "Gerontology and Geriatrics in Medical Education." *New England Journal of Medicine* 300: 228, 1979.

Eiler, Mary Ann, *Physician Characteristics and Distribution in the U.S., 1983 Edition*. American Medical Association, 1984.

Eisdorfer, Carl. "Care of the Aged: The Barriers of Tradition." *Annals of Internal Medicine* 94: 256-60, 1981.

Eraker, Stephen; and Politser, Peter. "How Decisions are Reached: Physician and Patient." *Annals of Internal Medicine* 97: 262-68, 1982.

Federated Council for Internal Medicine. "Geriatric Medicine: A Statement from the Federated Council for Internal Medicine." *Annals of Internal Medicine* 95: 372-76, 1981.

Fischer, Josef. "Hyperalimentation." *Medical Clinics of North America* 63: 973-983, September 1979.

Fisher, Michael; and Moxham, Patricia. "ICU Syndrome." *Critical Care Nurse* 4: 39-46, May/June 1984.

Freeman, Joseph T. "A Survey of Geriatric Education: Catologues of United States Medical Schools." *Journal of the American Geriatrics Society* 19: 746-62, September 1971.

Freeman, Richard. "Treatment of Chronic Renal Failure: An Update." *New England Journal of Medicine* 312: 577, 1985.

Friedman, Eli. "Critical Appraisal of Continuous Ambulatory Peritoneal Dialysis." *Annual Review of Medicine* 35: 233-48, 1984.

Friedson, Eliot. *Profession of Medicine*. New York: Dodd, Mead and Company, 1971.

Fries, James. "Aging, Natural Death, and the Compression of Morbidity." *New England Journal of Medicine* 303: 130-135, July 17, 1980.

Garibaldi, Richard; Brodine, Susan; Matsumiya, Sego. "Infections Among Patients in Nursing Homes." *New England Journal of Medicine* 305: 731-35, Sept. 24, 1981.

Gordon, Marjory. *Nursing Diagnosis: Process and Application*. New York: McGraw-Hill, 1982.

Greenbaum, Dennis. "Availability of Critical Care Personnel, Facilities, and Services in the United States." *Critical Care Medicine* 12: 1073-1077, 1984.

Greenbaum, Dennis; and Holbrook, Peter. "Fellowship Programs in Critical Care Medicine--1984." *Critical Care Medicine* 12: 399-408, 1984.

Greer, David. "Hospice: Lessons for Geriatricians." *Journal of the American Geriatrics Society* 31: 67-70, 1983.

Gregory, George. "Who Should Receive Intensive Care?" *Critical Care Medicine* 11: 767-68, 1983.

Gruber, Herman. "Geriatrics--Physician Attitudes and Medical School Training." *Journal of the American Geriatrics Society* 25: 494, 1977.

Gruenberg, Ernest. "The Failure of Success." *Milbank Memorial Fund Quarterly* 55: 3-24, 1977.

Hackett, T.; Cassem, N.; Wishnie, H. "The Coronary-Care Unit. An Appraisal of its Psychological Hazards." *New England Journal of Medicine* 279: 1365, 1968.

Harnish v. Children's Hospital Medical Center, 387 Mass 152 (1982).

Hayes, B. "Ventilation and Ventilators." *Journal of Medical Engineering and Technology* 6: 177-192, September/October 1982.

Hazzard, William. "The Practice of Geriatric Medicine." in Andres, R.; Bierman, E.; and Hazzard, W.; eds. *Principles of Geriatric Medicine*. New York: McGraw-Hill, 1985.

Heymsfield, S.; Bethel, R.; Ansley, J.; Nixon, D.; Rudman, D. "Enteral Hyperalimentation: an Alternative to Central Venous Hyperalimentation." *Annals of Internal Medicine* 90: 63-71, 1979.

Hook, E.; Horton, C.; Schaberg, D. "Failure of Intensive Care Unit Support to Influence Mortality from Pneumococcal Bacteremia." *Journal of the American Medical Association* 249: 1055-57, 1983.

Ingelfinger, F. "Informed (But Uneducated) Consent." New England Journal of Medicine 287: 465-66, 1972.

Institute of Medicine. Aging and Medical Education. Washington: National Academy of Sciences, 1978.

Jennett, Bryan. "Intensive Care for the Elderly." International Journal of Technology Assessment in Health Care 1: 7, 1985.

Jensen, Terri. "Determination of Nutritional Status in Critical Care." Journal of the American Dietetic Association 84: 1345-1348, 1984.

Kane, Robert; Hammer, Douglas; Byrnes, Nano. "Getting Care to Patients: A Problem and a Proposal." Medical Care 15: 174-80, 1977.

Kane, Robert; Ouslander, Joseph; and Abrass, Itamar. Essentials of Clinical Geriatrics. New York: McGraw-Hill, 1984.

Kane, R.; Solomon, D.; Beck, J.; Keeler, E.; Kane, R. Geriatrics in the United States: Manpower Projections and Training Considerations. Rand: Santa Monica, Ca., 1980a.

Kane, R.; Solomon, D.; Beck, J.; Keeler, E.; Kane, R. "The Future Need for Geriatric Manpower in the United States." New England Journal of Medicine 302: 1327, 1980b.

Kane, Rosalie; and Kane, Robert. Assessing the Elderly: A Practical Guide to Measurement. Lexington, Massachusetts: Lexington Books, 1981.

Kaplan, Harold; and Sadock, Benjamin. Modern Synopsis of Comprehensive Textbook of Psychiatry/III. 3rd ed. Baltimore: Williams and Wilkins, 1981.

Kassirer, Jerome. "The Principles of Clinical Decision Making: An Introduction to Decision Analysis." Yale Journal of Biology and Medicine 49: 149-64, 1976.

Katz, Jay. The Silent World of Doctor and Patient. New York: The Free Press, 1984.

Katz, N.; et al. "Delerium in Surgical Patients Under Intensive Care." Archives of Surgery 104: 310-13, 1972.

Kim, M.; McFarland, G.; and McLane, A. Classification of Nursing Diagnoses: Proceedings of the Fifth National Conference. St. Louis: C. V. Mosby, 1984.

Kim, M.; and Moritz, D. Classification of Nursing Diagnoses: Proceedings of the Third and Fourth National Conferences. New York: McGraw-Hill, 1982.

Knaus, W.; Draper, E.; Wagner, D.; Zimmerman, J.; Birnbaum, M.; Cullen, D.; Kohles, M.; Shin, B.; Snyder, J. "Evaluating Outcome From Intensive Care: A Preliminary Multihospital Comparison." Critical Care Medicine 10: 491-96, 1982.

Knaus, W.; Wagner, D.; Draper, E.; Lawrence, D.; and Zimmerman, J; "The Range of Intensive Care Services Today." Journal of the American Medical Association 246: 2711-2716, December 11, 1981.

Lauer, A.; Saccaggi, A.; Ronco, R.; Belledonne, M.; Glabman, S.; Bosch, J. "Continuous Arteriovenous Hemofiltration in the Critically Ill Patient." Annals of Internal Medicine 99: 455-460, 1983.

Lefton, E.; Bonstelle, S.; Frengley, J. "Success With An Inpatient Geriatric Unit: A Controlled Study of Outcome and Follow-up." Journal of the American Geriatrics Society 31: 149, 1983.

Leonard, J.C. "Can Geriatrics Survive?" British Medical Journal 1: 1335-6, May 29, 1976.

Libow, Leslie. "A Fellowship in Geriatric Medicine." Journal of the American Geriatrics Society 20: 580-584, 1972.

Libow, Leslie. "The Issues in Geriatric Medical Education and Postgraduate Training: Old Problems in a New Field." Geriatrics pp. 99-102, February 1977.

Libow, Leslie. "General Concepts of Geriatric Medicine," in Libow, Leslie; and Sherman, Frederick, eds. The Core of Geriatric Medicine. St. Louis: The C.V. Mosby Co., 1981.

Libow, Leslie; Sherman, Frederick, eds. The Core of Geriatric Medicine. St. Louis: The C.V. Mosby Company, 1981.

Lichtenstein, Howard; Winograd, Carol. "Geriatric Consultation: A Functional Approach." Journal of the American Geriatrics Society 32: 356-61, May 1984.

Lidz, C.; Meisel, A.; Osterweis, M.; Holden, J.; Marx, J.; Munetz, M. "Barriers to Informed Consent." Annals of Internal Medicine 99: 539-43, 1983.

Lowrie, Edmund; Teehan, Brendan. "Principles of Prescribing Dialysis Therapy: Implementing the Recommendations from the National Cooperative Dialysis Study." Kidney International 23: S-113--S-122, 1983.

Lubitz, James; and Prihoda, Ronald. "Use and Costs of Medicare Services in the Last Years of Life." in United States Department of Health and Human Services. Health, United States and Prevention Profile. DHHS Publication No. (PHS) 84-1232. Hyattsville, Maryland, 1983.

Lynn, Joanne. "Brief and Appendix for *Amicus Curiae*: The American Geriatrics Society. In the Matter of Claire C. Conroy." *Journal of the American Geriatrics Society* 32: 915-22, 1984.

MacBurney, Maureen; and Wilmore, Douglas. "Rational Decision-Making in Nutritional Care." *Surgical Clinics of North America* 61: 571-582, 1981.

Maklan, Claire. *Geriatric Specialization in the U.S.: Profile and Prospects*. Unpublished dissertation, University of Michigan, 1984.

Manton, Kenneth. "Changing Concepts of Morbidity and Mortality in the Elderly." *Milbank Memorial Fund Quarterly* 60: 183-244, 1982.

Matteson, Michael; Smith, Samuel. "Selection of Medical Specialties: Preferences Versus Choices." *Journal of Medical Education* 52: 548-554, 1977.

Meisel, Alan. "The Exceptions to the Informed Consent Doctrine: Striking A Balance Between competeing Values in Medical Decisionmaking." 1979 *Wisc. L. Rev.* 413.

Mendenhall, Robert; Lloyd John; Repicky, Paul; Monson, Joanne; Girard, Roger; Abrahamson, Stephen. "A National Study of Medical and Surgical Specialties: II. Description of the Survey Instrument." *Journal of the American Medical Association* 240: 1160-68, Sept. 8, 1978a.

Mendenhall, Robert; Girard, Roger; Abrahamson, Stephen. "A National Study of Medical and Surgical Specialties: II. Background, Purpose, and Methodology." *Journal of the American Medical Association* 240: 848-52, Sept. 1, 1978b.

Miller, Dulcy; Lowenstein, Regina; Winston, Ricky. "Physicians' Attitudes Toward the Ill Aged and Nursing Homes." *Journal of the American Geriatrics Society* 24: 498-505, 1976.

Mitchell, Janet. "Physician Visits to Nursing Homes." *The Gerontologist* 22: 45-48, 1982.

National Institutes of Health, "Consensus Conference: Critical Care Medicine." *Journal of the American Medical Association* 250: 798-804, August 12, 1983.

Nestle, Marion. "Leadership in Clinical Dietetics: Meeting the Challenge to Roles in Nutritional Support." *Journal of the American Dietetic Association* 84: 1349-53, 1984.

Panicucci, Carol. "Functional Assessment of the Older Adult in the Acute Care Setting." *Nursing Clinics of North America* 18: 355, 1983.

Perrotta, Peter; Perkins, David; Schimpfhauser, Frank; Calkins, Evan. "Medical Student Attitudes Toward Geriatric Medicine and Patients." *Journal of Medical Education* 56: 478-83, 1981.

Phillips, G.; Chong, C.; Gordon, P. "Nurse Staffing in Intensive Care Units." *Anaesthesia and Intensive Care* 11: 118-124, 1983.

Poe, W.D. "What is a Geriatrician?" *Journal of the American Geriatrics Society* 23: 458-59, October, 1975.

Portnoi, Valery. "What is a Geriatrician?" *Journal of the American Medical Association* 243: 123-25, January 11, 1980.

President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research. *Deciding to Forego Life-Sustaining Treatment*. March, 1983.

President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research. *Making Health Care Decisions*. October, 1982.

In the Matter of Karen Ann Quinlan, 70 N.J. 10 (1976).

Rango, Nicholas. "Nursing-Home Care in the United States." *New England Journal of Medicine* 307: 883-89, Sept. 30, 1982.

Residency Review Committee. "Special Requirements for Residency Training Programs in Internal Medicine." September, 1985.

Reuler, James; Cooney, Thomas. "The Pressure Sore: Pathophysiology and Principles of Management." *Annals of Internal Medicine* 94: 661-666, 1981.

Rice, Dorothy; and Feldman, Jacob. "Living Longer in the United States: Demographic Changes and Health Needs of the Elderly." *Milbank Memorial Fund Quarterly* 61: 362-396, 1983.

Robbins, Alan; Mather, John; Beck, John. "Status of Geriatric Medicine in the United States." *Journal of the American Geriatrics Society* 30: 211-18, March 1982a.

Robbins, Alan; Vivell, Susan; Beck, John. "A Study of Geriatric Programs in the United States." *Journal of Medical Education* 57: 79-86, 1982b.

Robin, Eugene. "A Critical Look At Critical Care." *Critical Care Medicine* 11: 144, 1983.

Rowe, John. "Clinical Research on Aging: Strategies and Directions." *New England Journal of Medicine* 297: 1332-36, 1977.

Rowe, John. "The Future of Academic Geriatrics." Milo D. Leavitt Memorial Lecture. Speech made in New York at the annual meeting of the American Geriatrics Society, July 12, 1985a.

Rowe, John. "Health Care of the Elderly." New England Journal of Medicine 312: 827-35, March 28, 1985b.

Rowe, John; and Besdine, Richard, eds. Health and Disease in Old Age. Boston: Little, Brown and Company, 1982.

Rubenstein, L.; Josephson, K.; Wieland, G.; English, P.; Sayre, J.; Kane, R. "Effectiveness of a Geriatric Evaluation Unit: A Randomized Clinical Trial." New England Journal of Medicine 311: 1664, 1984.

Rubenstein, L.; Rhee, L.; Kane, R. "The Role of Geriatric Assessment Units in Caring for the Elderly: An Analytic Review." Journal of Gerontology 37: 513-21, 1982.

Saunders, R.; Hickler, R.; Hall, S.; Hitzhusen, J.; Ingraham, M.; Li, L. "A Geriatric Special-care Unit: Experience in a University Hospital." Journal of the American Geriatrics Society 31: 685, 1983.

Schneider, Edward; and Brody, Jacob. "Aging, Natural Death, and the Compression of Morbidity: Another View." New England Journal of Medicine 309: 854-56, October 6, 1983.

Shock, Nathan. "System Integration," in Finch, Caleb; and Hayflick, Leonard, eds. Handbook of the Biology of Aging. New York: Van Nostrand Reinhold Company, 1977.

Simons, Richard; and Pardes, Herbert. Understanding Human Behavior in Health and Illness. 2nd ed. Baltimore: Williams and Wilkins, 1981.

Solomon, Kenneth; and Vickers, Raymond. "Attitudes of Health Workers Toward Old People." Journal of the American Geriatrics Society 27: 186-191, 1979.

Solon, Jerry; and Greenawalt, Leo. "Physician's Participation in Nursing Homes." Medical Care 12: 486-497, 1974.

Spence, Donald; Feigenbaum, Elliott; Fitzgerald, Faith; Roth, Janet. "Medical Student Attitudes Toward the Geriatric Patient." Journal of the American Geriatrics Society 16: 976-983, 1968.

Steel, Knight. "Geriatric Medicine: From Neonate to Toddler." Archives of Internal Medicine 145: 811-813, May 1985.

Steel, Knight. "Geriatric Medicine is Coming of Age." The Gerontologist 24: 367-72,1984a.

Steel, Knight. "Iatrogenic Disease on a Medical Service." *Journal of the American Geriatrics Society* 32: 445-49, 1984b.

Steel, K.; Gertman, R.; Crescenzi, C.; *et al*. "Iatrogenic Illness on a General Medical Service at a University Hospital." *New England Journal of Medicine* 304: 638, 1981.

Steffee, William. "Malnutrition in Hospitalized Patients." *Journal of the American Medical Association* 244: 2630-2635, 1980.

Superintendent of Belchertown v. Saikewicz, 373 Mass 728 (1977).

Swanson, August. "The Role of Geriatrics in Medical Education." *Journal of Medical Education* 54: 59, 1979.

Taylor, D.E.M. "Problems of Patients in an Intensive Care Unit: The Aetiology and Prevention of Intensive Care Syndrome." *International Journal of Nursing Studies* 8: 47-51, 1971.

Teasdale, T.; Shuman, L.; Snow, E.; Luchi, R. "A Comparison of Placement Outcomes of Geriatric Cohorts Receiving Care in a Geriatric Assessment Unit and on General Medicine Floors." *Journal of the American Geriatrics Society* 31: 529, 1983.

Thibault, G.; Mulley, A.; Barnett, G.; Goldstein, R.; Reder, V.; Sherman, E.; Skinner, E. "Medical Intensive Care: Indications, Interventions, and Outcomes." *New England Journal of Medicine* 302: 938-42, 1980.

Truman v. Thomas, 27 Cal.3d 285 (1980).

Trunet, P.; LeGall, J.; Lhoste, F.; *et al*. "The Role of Iatrogenic Disease in Admissions to Intensive Care." *Journal of the American Medical Association* 244: 2617, 1980.

Twardowski, Zbylut; and Nolph, Karl. "Blood Purification in Acute Renal Failure." *Annals of Internal Medicine* 100: 447-49, 1984.

United States Department of Health and Human Services. *Health, United States and Prevention Profile*. DHHS Publication No. (PHS) 84-1232. Hyattsville, Maryland, 1983.

Vestal, Robert. "Drug Use in the Elderly: A Review of Problems and Special Considerations." *Drugs* 16: 358-382, 1978.

Wanzer, S.; Adelstein, S.; Cranford, R.; Federman, D.; Hook, E.; Moertel, C.; Safar, P.; Stone, A.; Taussig, H.; van Eys, J. "The Physician's Responsibility Toward Hopelessly Ill Patients." *New England Journal of Medicine* 310: 955-59, April 12, 1984.

Wasson, J.; Sox, H.; Neff, R.; Goldman, L. "Clinical Prediction Rules: Applications and Methodological Standards." New England Journal of Medicine 313: 793, September 26, 1985.

Webster, S. "The Clinical Contents of Geriatrics." Journal of the Royal College of Physicians of London 13: 113-16, 1979.

Weil, Max; and Shubin, Herbert. "The New Practice of Critical Care Medicine." Chest 59: 473-74, 1971.

Weisman, I.; Rinaldo, J.; Rogers, R. "Positive End-Expiratory Pressure in Adult Respiratory Failure." New England Journal of Medicine 307: 1381-84, November 25, 1982.

Wennberg, J.; Bunker, J.; Barnes, B. "The Need For Assessing The Outcome of Common Medical Practices." Annual Review of Public Health 1: 277-95, 1980.

Williams, Mark; Hadler, Nortin. "The Illness as the Focus of Geriatric Medicine." New England Journal of Medicine 308: 1357-60, Nov. 22, 1983.

Williams, Mark; and Retchin, Sheldon. "Clinical Geriatric Research: Still in Adolescence." Journal of the American Geriatrics Society 32: 851-857, 1984.

Williams, T.; Hill, J.; Fairbank, M.; Knox, K. "Appropriate Placement of the Chronically Ill and Aged: A Successful Approach by Evaluation." Journal of the Amercian Medical Association 226: 1332, 1973.

Wolk, Robert; and Wolk, Rochelle. "Professional Workers' Attitudes Toward the Aged." Journal of the American Geriatrics Society 19:624-639, 1971.

Youngner, S.; Lewandowski, W.; McClish, D.; Juknialis, B.; Coulton, C.; Bartlett, E. "'Do Not Resuscitate' Orders: Incidence and Implications in a Medical Intensive Care Unit." Journal of the American Medical Association 253: 54, 1985.

Zimmer, A.; Calkins, E.; Hadley, E.; Ostfeld, A.; Kaye, J.; Kaye, D. "Conducting Clinical Research in Geriatric Populations." Annals of Internal Medicine 103: 276-283, 1985.

Life-Sustaining Technologies and the Elderly:
Manpower for Selected Technologies

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January 1986

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Introduction

This paper discusses manpower use and manpower issues related to five life-sustaining technologies widely used by the elderly: dialysis, mechanical ventilation, resuscitation, antibiotics, and nutrition support. These five technologies highlight issues of manpower, manpower training, organization and delivery of services and financing that go well beyond the specific technologies. The report is divided into three parts.

I. Staffing Patterns for the Five Technologies

II. Analysis of Major Issues in Manpower and Training

III. Nutrition Support and the Elderly.

The case study of nutrition support was selected from among the five technologies because it exemplifies the range of problems and issues related to the increasing use of technology oriented services for the elderly. These issues include the efficacy of the specific technology and the appropriateness of its use, types of manpower that provide the technology, training and limitations on training of the personnel, sites of service, influence of reimbursement on use of service, and the sites of care and training.

I. Staffing Patterns for Five Technologies

Manpower use for technologies varies widely by the specific technology, the sites of care, the specific institution or agency providing the care, availability of manpower specifically trained to use the technology, and reimbursement policies.

The attached charts depict the minimum typical health care team configuration for each of the five technologies: dialysis, mechanical ventilation, resuscitation, antibiotics and nutrition support. Team members are listed in hierarchical order, although in some cases, lines of authority are unclear. For example, members of a hospital nutritional support team, specifically the pharmacist, dietitian and social worker, have individual responsibilities and confer with each other, but all may report to the physician or nurse on the team.

The staff lists are minimum personnel configurations for the technologies. In a hospital setting the number of staff involved in the delivery of the technology will vary according to the size and type of hospital, including teaching or nonteaching hospital and proprietary or voluntary hospital.

The charts also list the settings in which the elderly receive these technologies. The comments in the cells note how and where patients gain access to the technology and major variations in the involvement of health care professionals.

Technology	Dialysis
Staff	Physician: Nephrologist Nephrology RN* LPN* Renal Dietitian (clinical) Renal Social Worker Nephrology Technician* Differences in staffing between hospital-based and free-standing facilities relate to number and not type of personnel, and on patient load and number of machines rather than facility status.
Patient Settings	
Hospital Acute unit Chronic unit	Most patients are ambulatory. Inpatients are usually acute cases and require more intensive use of RNs and LPNs and technicians; staffing ratio may be one RN to each patient in acute unit; 1 RN for 4-5 patients in chronic unit.
Nursing homes Skilled nursing facility (SNF) Intermediate care facility(ICF)	Patients are sent to dialysis centers. If they are not ambulatory, they will be admitted to a hospital for care. Self-care patients (peritoneal dialysis) attend training at a dialysis center, but are monitored in nursing home by RN.
Free-standing dialysis center or hospital satellite	Patient undergoes hemodialysis three times per week for four hours. Blood and other vital signs are monitored by RNs, LPNs or technicians.
Home	Patient attends 6-8 weeks of hemodialysis training at a dialysis center. Patient is then monitored once per month at the center. For peritoneal dialysis patient attends 1-2 weeks of training at a dialysis center. Patient is then monitored once per month at the center.
Hospice	Dialysis is not initiated by hospice. Patients using dialysis prior to entering hospice continue to receive care at a dialysis center or administer self-care at home (peritoneal dialysis).

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* Likely to have the most contact with the patient.

Technology	Mechanical Ventilation
Staff	Physician: Pulmonary specialist or Anesthesiologist RN* Respiratory Therapist (RT)* Respiratory Technician* Clinical dietitian (may act as a consultant)
Patient Settings	
Hospital ICU Non-ICU	Pulmonary specialists head about 60 percent of RT departments. Parameters of care are given by the department head. In an ICU setting the critical care nurse or ICU nurse is responsible for the physical care of the patient. The RT assigned to the ICU is primarily responsible for the machine. On the nursing floor, the RT takes more responsibility for the care of the patient. Respiratory technicians work on the nursing unit. The scope of independent decisionmaking is limited by state and sometimes by county regulations.
Nursing homes Skilled nursing facility (SNF) Intermediate care facility (ICF)	There is very little use of mechanical ventilation at this time. The American Health Care Association (nursing homes) is currently negotiating with AART to develop standards and procedures.
Home	Not common. Patients usually use machines from durable medical equipment (DME) companies who also provide personnel to operate and maintain machines. Personnel may be RNs or RTs depending on reimbursement capabilities. Medicare does not cover the services of RTs, but under Part B, Medicare covers 80 percent of the cost of oxygen equipment . A relative may also be trained to monitor equipment and assess patient's condition.
Hospice	Rarely requested. If a patient requests this technology, hospice may arrange for RN or contract for RT with another organization, e.g., home health care agency or oxygen company.

* Likely to have the most contact with the patient.

Technology	Resuscitation	
Staff	Hospital Code Team	Rescue Squad
	Staff physician: emergency medicine specialist or on-duty staff resident) Anesthesiologist) Critical Care Nurse*) Respiratory Therapist* These personnel work as a team but each has individual responsibilities.	Emergency Technician-Ambulance* Emergency Technician-Paramedic* Both consult with local emergency resource center using procedures in accordance with U.S. Department of Transportation Guidelines.
Patient Settings		
Hospital Emergency care	Hospital may agree to serve as emergency resource center staffed by a physician, often an emergency medicine specialist. Staff composition may vary by type of patient, e.g., shock trauma, burn, cardiac. Teaching hospitals may include medical or surgical residents, floor nurses and interns in the response team.	
Nursing homes Skilled nursing facilities (SNF) Intermediate care facilities (ICF)	Nursing home RN or LPN calls local rescue squad and informs senior medical person at nursing home. All nursing personnel are required to be certified in CPR techniques.	
Home	Local rescue squad is called for basic life support procedures and transport to hospital.	
Hospice	Rarely requested. If patient requests technology, local rescue squad would be called to home or professional staff at hospice would initiate resuscitation procedure.	

* Likely to have the most contact with the patient.

Technology	Antibiotics
Staff	Attending physician: may be family practice physician or internist or virtually any other medical specialist who provides attending services Staff physician: may be internist or other physician providing attending services RN* (IV nurse is RN with training in intravenous procedures) LPN*
Patient Settings	
Hospital	
ICU	The decision to administer in life-threatening situations depends on co-morbidities and stage of dying process in which illness occurs. In ICU setting critical care nurse would administer treatment.
Non-ICU	In non-ICU setting primary nurse on floor or IV nurse (if necessary) would administer treatment and monitor patient. LPN may monitor patient under supervision of RN.
Nursing home	
Skilled nursing facility (SNF) Intermediate care facility (ICF)	The medical director makes the decision to administer antibiotics. Decision depends on co-morbidities and stage of dying process in which illness occurs.
Home	Physician prescribes antibiotics. RN or LPN with RN supervision administers antibiotics and monitors patient progress. Nursing personnel may be provided by a home health agency, visiting nurses' association (VNA) or proprietary home health care company.
Hospice	Rarely done.

* Likely to have the most contact with the patient.

Technology	Nutritional Support
Staff	Attending physician: may be family practice physician or internist or any primary contact physician Staff physician: may be family practice physician or internist or any primary contact physician RN* (IV nurse is RN with training in intravenous procedures) LPN*) Dietitian) Pharmacist) Social worker These personnel work as a team with individual responsibilities.
Patient Settings	
Hospital	The decision to administer in life-threatening situations depends on co-morbidities and the stage of the dying process in which the illness occurs. In a hospital setting, the physician (attending) prescribes the treatment. The hospital pharmacist mixes the solution according to the dietitian's specifications, and a nurse (RN or IV nurse) pours the solution. LPNs, under supervision of RNs, may change dressing, stop and start flow of nutrients in parenteral nutrition.
Nursing homes Skilled nursing facility (SNF) Intermediate care facility (ICF)	The medical director makes the decision to administer nutritional support. Decision depends on co-morbidities and stage of dying process in which illness occurs. The RN may be provided by a home health agency, visiting nurses' association, or home health company, if trained nurse (e.g., IV nurse) is not on staff. LPNs are supervised by RNs.
Home	The RN (or IV nurse) who visits the home may be provided by a home health agency, visiting nurses' association or a proprietary nutritional support/home care company. Solution may be provided by a hospital pharmacy, local pharmacy or a proprietary home care company. A relative may also be trained to mix the solutions and administer feedings.
Hospice	Rarely done.

* Likely to have the most contact with the patient.

II. Analysis of Major Issues in Manpower and Training

Introduction

Techniques for estimating manpower needs are crude and are dependent on a number of variables that can change rapidly. These variables include but are not limited to: level of technology; epidemiologic and demographic characteristics of the population; financing and reimbursement policies; consumer demand; provider-induced demand; overlap among manpower categories and substitution; licensure and credentialing. Furthermore, skill levels affect the ability of manpower supply to respond. For example, at aide and technician levels only short time periods may be needed (less than one year) to train or retrain manpower either in on-the-job or in academic settings. In the technologies described in ~~Task 1,~~ I , the actual routine delivery of services is frequently provided by aides and technicians who require one or two years of post-high school training, while supervision is provided by existing, more highly skilled personnel. Certain generic professional skills such as nursing may be easily adapted to new skill development. On the other hand, subspecialties requiring physician or other doctoral level manpower may take a number of years to develop, and there will be a time lag between perceived need and manpower availability, during which rapid changes can occur.

Dialysis is an example of a specialty, nephrology, which developed relatively rapidly once the financing for use of the technology was available. The number of allied manpower who assist in the delivery of dialysis grew very rapidly. In fact, the financing and development of this technique and subspecialty may have impeded the optimal development of alternative therapies such as transplantation and may have led to inappropriate and excess use of the technology.

To some extent because of the "uncertainty" of medical decisionmaking and existing alternative technologies, provider-induced demand is a major factor in actual use of health care services. Medical uncertainty and provider-induced demand are current facts of life. The absence of systematic technology assessment of medical procedures and practices impedes planning for and control of the use of technologies and hence structured manpower policy. On the other hand, reimbursement policies relating to levels of payment, sites of payment, and covered services affect the rapidity of diffusion of technologies and their use rates. The current changes in the financing and delivery of services and payment policies make projections of future use of services and future manpower needs difficult to predict.

Social and ethical values also affect the use of life-sustaining technologies. The growth of "living wills" and "do not resuscitate" instructions can have a major effect on use of these technologies and consequently on manpower. Finally, a major issue that recurs in health manpower is the territorial issue, including skill levels, substitutability and exogenous barriers such as licensure, credentialing and accreditation.

The major factors that will influence the future use of the five technologies are highlighted in this ~~report.~~ section.

Growth and Aging of the Elderly Population

The elderly population in the United States, defined as those over 65, more than doubled from 1950 to 1980, from 12.4 million to 24.9 million, increasing from 8.1 percent of the total population to 11.2 percent. This trend is expected to continue. Current projections to the year 2030 show that the aged will comprise 18.3 percent of the total population at that time (Table 1) (Feinstein and Gornick, 1984), representing a rate of increase among the elderly population that will greatly exceed the increase in the U.S. total population. In 1980, one in nine persons was 65 or older. In 2030 it is expected that one in five persons will be aged 65 or over.

While the relative number of elderly persons in this country has been increasing since 1950, the distribution of aged has shifted toward the older age groups. The 75-84 and 85+ age groups continue to show the most rapid rate of growth. The number of people aged 85 and over increased from 600,000 in 1950, or less than one percent of the over 65 age group, to 2.5 million in 1982, or 14 percent of the over 65 population. The number of people 75 to 84 years of age more than doubled during the same period (National Center for Health Statistics, 1984). The increase in the proportion of the population that is elderly, and especially in the over 85 group, is expected to continue during the next few decades (Table 2).

The rise in life expectancy has contributed significantly to the increase in the elderly population. Much of the early increase in the life expectancy of the elderly resulted from the introduction of antibiotics which reduced mortality from infectious diseases, and allowed a larger proportion of the population to survive beyond childhood. The use of antibiotics also reduced

Table 1

U.S. Population Aged 65 Years and Over:
Selected Years and Projections, 1950-2030

Year	Number in thousands	Percent of U.S. population
1950	12,397	8.1
1970	20,087	9.9
1980	24,927	11.2
2000	31,822	12.2
2010	34,837	12.7
2020	45,102	15.5
2030	55,024	18.3

Source: U.S. Bureau of the Census, In: Long-Term Care Financing and Delivery Systems. Health Care Financing Administration, Washington, D.C. 1984.

Table 2

Ten-Year Percent Increases in Aged U.S. Population, by Age Groups: Selected Years and Projections 1950-2010

Period	All ages	65-74	75-84	85+
1950-1960	18.7	30.1	41.2	59.3
1960-1970	13.4	13.0	31.7	52.3
1970-1980	8.7	23.4	14.2	44.6
1980-1990	10.0	13.8	26.6	20.1
1990-2000	7.1	-2.6	15.6	29.4
2000-2010	6.2	13.3	-2.4	19.4

Source: U.S. Bureau of the Census, In: Long-Term Care Financing and Delivery Systems. Health Care Financing Administration, Washington, D.C. 1984.

the mortality rate from pneumonia--once a leading cause of death among the elderly--from 26.2 per 100,000 in 1950 to 11.2 per 100,000 in 1983 (National Center for Health Statistics, 1984). In more recent years the development and use of oxygen therapy for chronic respiratory diseases, and the growing use of dialysis and nutritional support, together with the use of increasingly sophisticated resuscitation measures have contributed to extend the life expectancy of the elderly.

It is quite clear that the longer a person lives, the greater is the possibility he will develop a chronic illness or disability. As persons age, then, their need for medical and personal care rises significantly. One of the reasons why the aged account for a disproportionate share of health care expenditures is that the last year of a person's life tends to be highly medically intensive (HCFA, Fall 1984).

The elderly tend to use more hospital care per capita than does the general population. In 1982, 28 percent of all discharges from non-federal short-stay hospitals were elderly patients, and hospital use among the elderly seems to be increasing. A survey of community hospitals by the American Hospital Association (AHA) found that admissions reached a level of 11.8 million in 1983, an average growth of 4.8 percent per year since 1977. While length of stay declined during the period, the number of patient days rose 3.0 percent annually, to 114 million in 1983. (Admissions for the rest of the population fell 0.4 percent per year; inpatient days fell 1.1 percent per year) (HCFA, Fall 1984). Recent changes in reimbursement for hospital care have accelerated the decline in average lengths of stay.

Personal care needs also rise with age. A 1977 survey showed that 3.5 percent of persons aged 65-74 required assistance with activities of daily living (ADL). This percentage rose to 35 percent for those over 85 (Table 3).

As one would expect, there is a greater likelihood of being in a nursing home as an individual ages. In 1977, about 1.1 million persons, or about 5 percent of those over 65, were nursing home residents. Of these, 41 percent were between 75 and 84 years of age, and 40 percent were over 84 years old. Only 7 percent of elderly nursing home residents were completely independent with respect to performing daily personal care activities. About 45 percent received intensive nursing care, and another 40 percent were receiving a lesser level of nursing care (National Center for Health Statistics, 1984).

The perceived health status of many elderly persons is low relative to the general population. In a 1976 survey of the non-institutionalized population, 31 percent of those 65 and over assessed their health as fair or poor, and 39 percent reported a health problem that limited or prohibited the performance of a major activity of daily living or home management (National Center for Health Statistics, 1984).

Older individuals at the end of life are subject to multiple chronic illnesses and ultimately terminal illnesses which may require life-sustaining care for varying periods. Advances in technology have enabled health professionals to prolong life, but medical treatment may require various life-sustaining and maintenance techniques with potentially high costs and differing results in quality of life (Peteet et al, 1981) (Ladefoged, 1981) (Twomey, 1985).

Table 3

Percent of Persons Having ADL Dependency and Percent of Persons in Nursing Homes, by Age: 1977

Age Group	(1) Percent Having ADL Dependency	(2) Percent Residing in Nursing Home	Ratio between (2) and (1)
45-64	1.2	0.3	.24
65-74	3.5	1.4	.40
75-84	11.3	6.4	.56
85+	35.1	21.6	.61

Source: 1977 National Nursing Home Survey and 1977 National Health Interview Survey, In: Long-Term Care Financing and Delivery Systems. Health Care Financing Administration, Washington, D.C. 1984.

Emergence of Geriatrics as a Specialty

Medicine

The evolution of geriatrics in the United States can be traced to the late 1800s and early 1900s. I. L. Nascher published the first American textbook on geriatric medicine in 1914. During the next three decades interest in geriatrics waned and resurfaced periodically until the 1940s when two societies concerned with the elderly and diseases of old age were formed. The American Geriatrics Society, composed of physicians, was formed in 1942; the Gerontological Society was established in 1945 and served broader interests. The formation of these groups coincided with the development of most of the life-sustaining technologies during World War II. In fact, technology advancement during the period spurred the development of most of the subspecialties in medicine and surgery after World War II.

As in the 1920s and 1930s, concern about the status of the elderly waned during the 1950s. The 1960s saw a reawakening of interest in the elderly which culminated in the passage of the Medicare amendments to the Social Security Act. It was not until the middle 1970s, however, that ~~the American Geriatrics Society~~ organizations with an interest in the health of the elderly began to explore the necessity for special education opportunities in geriatric medicine. ~~The Society also~~ These organizations also addressed the issue of recognition of geriatrics as a separate and distinct medical specialty.

The federal government, by providing massive amounts of funds for the health care of the elderly, became intimately involved in the needs and status of the elderly. In 1971 the White House Conference on Aging was convened, and in 1974 the National Institute on Aging (NIA) was established. The NIA funded studies by the Institute of Medicine (IOM) to explore the extent to which aging was part of the curriculum of U.S. medical schools, and to address the issue of geriatrics as a separate specialty.

In examining the issue of a separate geriatrics medical specialty, the IOM recommended against the establishment of a formal board-certified specialty, expressing a belief that aging should continue to be the subject of special emphasis within the purview of the internist or general (family) practitioner. Both the American Board of Internal Medicine and the American Board of Family Practice have provided for recognition of specialty training in geriatrics within their training programs.

The IOM found that few medical schools had required courses in geriatrics, and recommended increased efforts on the part of medical schools to recruit faculty to develop the necessary academic courses in geriatrics and gerontology.* (Robbins, Vivell, Beck, 1982).

Growth of Geriatrics Training

A survey conducted between 1979 and 1981 identified 86 medical schools and 6 non-affiliated institutions, 68 percent of the schools, with programs in geriatrics. Of these, 12 reported geriatrics training at all three levels of medical education--undergraduate, graduate and fellowship--and 36 reported training opportunities at only one level (Table 4). More than half of all the geriatrics programs surveyed were established after 1979. Only 9 percent of the undergraduate programs and 32 percent of the graduate programs were required curricula (Table 5).

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* There is a technical distinction between the fields of gerontology and geriatrics with the former subsuming social and behavioral aspects of aging and the latter focused on medical care. The subsequent discussion is limited to geriatrics.

Table 4

Programs in Geriatric Medicine Training Identified and Surveyed, 1979-80

Type of Program	No. of Institutions[1] with Programs	No. of Programs Identified	No. of Program Surveys Completed	Percent of Surveys Completed
Undergraduate	76	133	108	81.2
Graduate	35	44	37	84.1
Geriatric Fellowship	34	42[2]	39	92.9
Total	92	219	184	84.0

[1] 86 medical schools; 6 non-affiliated institutions.
[2] On re-survey for 1981-82, 36 fellowship programs were identified.

Source: Robbins, A.S., Vivell, S., Beck, J.C.: A Study of Geriatrics Training Programs in the United States. J. Med. Educ. 57: February 1982. (Adapted from Table 1.)

Table 5

General Characteristics of Undergraduate and Graduate Geriatrics Training Programs

Characteristic	Undergraduate Medical Education		Graduate Medical Education	
	Number	Percent	Number	Percent
Year Began				
Before 1970	0	-	0	-
1970-1972	3	3	5	14
1973-1975	6	6	2	5
1976-1978	26	24	8	22
1979-1981	57	53	16	43
Not Reported	16	15	6	16
Total	108	100	37	100
Program Status				
Required	10	9	12	32
Elective	89	82	25	68
Selective	9	8	0	-
Total	108	99	37	100

Source: Robbins, A.S., Vivell, S., Beck, J.C.: A Study of Geriatric Training Programs in the United States, J. Med. Educ. 57: 79-86, February 1982.

Faculty members with administrative responsibility for geriatrics programs tended to be drawn from the specialties of internal medicine or psychiatry, with few identifying themselves as "geriatricians." Nursing homes served as major sites of training for undergraduate students; for graduate medical education, nursing homes and the general medical ward figured almost equally as training sites (Table 6) (Robbins, Vivell, Beck, 1982).

A more recent survey reporting on 100 medical schools showed 72 percent with required time for geriatric education. Allowing for definitional variations between the two surveys, it appears that opportunities to obtain geriatric training are increasing rapidly (Barry, Ham, 1985).

While the availability of geriatric education is expanding, considerable controversy continues as to whether geriatrics should be a separate medical specialty. Among the arguments set forth for the recognition of geriatrics as a separate specialty is that, with the growth of the elderly population, including the number of very old, primary care or gatekeeper physicians and nurse clinicians specifically trained in the physiologic, behavioral and functional changes of aging will be required (Somers, 1983) (Kane et al, 1980). Kane et al project that by 1990 there will be a need for about 8,000 geriatricians in the United States. Aging, proponents argue, has particular effects on the body and its functions which require specialized knowledge on the part of the physician. Therefore, a separate, identifiable body of knowledge and set of skills do exist which are criteria for specialty recognition (Robbins et al, 1982). In addition, proponents of the separate specialty claim that family practitioners and internists as well as other specialists are not trained to recognize the special needs of the aging and often do not take into account physiologic and life style changes that affect the outcome of various treatment modalities.

Table 6

Geriatric Training Sites in Order of Decreasing Frequency for all Programs

Training Sites*	Percent Clinical Medical Students (n=59)	Percent Graduate Medical Education (n=34)	Percent Geriatric Medicine Fellowships (n=25)	Percent Geropsychiatry Fellowships (n=13)
Nursing home	76.3	52.9	72.0	46.2
Geriatric evaluation unit	40.7	35.3	68.0	
Geriatric clinic	35.6	35.3	80.0	
General medicine ward		47.1	60.0	
Senior citizen center	40.7			
Patient's home	32.2			
Home care program	32.2	26.5		
Rehabilitation ward			44.0	
Geropsychiatry ward		26.5		53.8
Psychiatry ward				46.2
Psychiatric clinic				69.2
Integrated health and social service center				30.8

* Other training sites included day care center, retirement home, family practice unit, general medical clinic, hospice, outpatient geriatric evaluation unit, surgical and other specialty wards, neighborhood health clinic, private practice, and public health clinic.

Source: Robbins, A.S., Vivell, S., Beck, J.C.: A Study of Geriatric Training Programs in the United States, J. Med. Educ. 57: 79-86, February 1982.

The opposing view holds that specialists are already trained in physiologic and behavioral aspects for all age groups and the elderly as well as other adult groups suffer from the same basic acute and chronic illnesses, heart disease, hypertension, and diabetes with different incidence at various age groups (Robbins et al, 1982).

Furthermore, some fear that if geriatrics were a separate specialty, demand would mount for such specialists and would diminish the limited resources and energy available to improve the quality and training of nurses and allied health professionals who provide routine and maintenance care of the elderly (Robbins et al, 1982).

Nursing

Traditionally nursing has played a crucial role in the care of the elderly, especially in long-term care settings, and indeed registered nurses comprise the largest number of health professionals providing long-term care. There is currently an estimated shortage of nurses with expertise in long-term care and with projected increases in the size of the aged population, this shortage is expected to become more serious (Reif, 1982). However, it is possible that the reduction in the general nursing shortage of earlier years may provide a new, available pool of nursing manpower to serve the elderly.

Specialty training in geriatric nursing is a relatively recent development. Efforts to include geriatric nursing content in entry-level nursing programs began in the late seventies but achieved only minimal success.. There are no data on major changes in curriculum content in most entry-level nursing programs.

More geriatric curriculum content is found in nurse practitioner and graduate level programs. In 1982, there were 23 programs designed to produce geriatric nurse specialists. Most of these programs were dependent on federal funding which was to be reduced in the 1983 federal budget (Reif, 1982). However, Congress has consistently rejected reductions in nurse training programs.

Although ultimate legal responsibility for medical care lies with the physician, coordination of daily activities related to prescribed care has traditionally fallen to a nurse, especially in long-term care and long-term care settings. Some educators think nursing programs need to provide students with opportunities to gain experience by working as members of interdisciplinary health care teams, "working in a peer relationship with physicians," or working as equal partners with patients and family members "when designing and executing a plan for care" (Reif, 1982). Nursing education programs have effectively fulfilled the need for these types of opportunities in hospitals, especially in critical care settings (Mechanic and Aiken, 1982). However, this is not now the case for long-term care in most nursing education programs, leaving the long-term care nurse to seek out the few universities with geriatric training centers, or to seek out opportunities through informal, in-service training experiences.

The past decade has seen the emergence of geriatric nurse practitioners as important providers of long-term care. There are 25 geriatric nurse practitioner programs that award graduate degrees, and 10 that award continuing education certificates (Ebersole, 1985). Seven certificate programs allow nurses with a diploma or an associate degree to advance their education while remaining in their chosen field of long-term care. These programs are especially important in view of the finding that 83 percent of nursing home directors are diploma-educated, 7 percent hold associate degrees, and only 10 percent hold a bachelor's degree (Shields, Kick, 1982).

Because they are trained to manage common acute and chronic health problems, geriatric nurse practitioners probably can reduce the incidence of emergency hospital encounters for residents of nursing homes (Ebersole, 1985). A 1975 study comparing care provided by nurse practitioners to that of resident physicians concluded that the geriatric nurse practitioners "can be as adept as some physicians in identifying patients' medical problems" (Lowenthal, Breitenbucher, 1975).

Teaching Nursing Homes

With the increased interest in geriatrics training, teaching nursing homes have become important sites for health professions education. Teaching nursing homes are being established in both public and private, for-profit and not-for-profit facilities, with a similar diversity of funding sources (Williams, 1985).

The Robert Wood Johnson Foundation funded affiliations between 11 schools of nursing and nursing homes in 1982. Recently affiliations between medical schools and nursing homes have been funded by the National Institute on Aging, and some programs have been developed by the Veterans Administration (Jahnigen et al, 1985).

The development of teaching affiliations between nursing homes and health professions schools is seen by some as a positive move toward redress of the historical paucity of medical care available to nursing home residents. Only 8.3 percent of physicians make nursing home visits and even those spend 1½ hours per month or less with their nursing home patients (Aiken et al, 1985). Smits (1975) found that only 17 percent of physicians participate in nursing home care at all. However, growing market pressures on the so-called surplus of physicians may result in an increase in physicians' activities in nursing homes and with the elderly.

Teamwork in the Provision of Medical Care

The concept of team care, care involving multiple providers of health and social services in optimal functional relationships that simultaneously provide quality and cost effective care, is not new. Historically geriatrics has been based on the need for a multidisciplinary holistic approach to the care of the elderly. Team care has evolved particularly well in three types of medical care: health maintenance organizations, certain high technology, critical care or life-sustaining techniques like transplant or nutrition support teams, and areas where medical and social services intersect like long-term nursing home or home care. However, in practice, "team care" has often been used in an ad hoc rather than a conscious manner. Team care has been implemented in instances where "many hands" were necessary or in instances where cost reduction or shortages of personnel forced the care issue. The team concept has been the exception rather than the rule in geriatric manpower training. An experiment in interdisciplinary geriatrics training of nursing and medical students at Albert Einstein College of Medicine established teams of one medical and two nursing students in order to conduct patient work-ups. While medical students' perceptions of the nurses' role in caring for the elderly were significantly increased, medical and nursing students' perceptions of the importance of the nurse in caring for the elderly varied substantially (Croen et al, 1984)

The needs of the elderly are quite complex and extend far beyond the purely medical. Advancing age may bring inactivity, immobility, and impaired social, environmental or mental health. Health problems of the elderly tend to be chronic, require frequent intervention and may call for types of care not effectively or desirably provided by physicians. In terms of care for the elderly it is generally recognized that traditionally, daily care of the elderly has been provided by the patients themselves, nurses, aides, therapists, social workers and family members.

In terms of care for the terminally ill elderly, the technologic advances since World War II have served as a stimulus to spin off delivery of certain services to manpower other than physicians and nurses trained in specific technical skills. In addition, the relatively recent shift to health care delivery in out-of-hospital settings has placed new emphasis on the increasing need for coordination of care. Traditionally, the physician delegated a care plan to nurses and family members. More and more the gatekeeper concept has been used by health maintenance organizations and alternative care settings such as the home. While the physician continues to serve as the focus or gatekeeper of the initiation of the pattern of care, and the nurse serves as general supervisor of the day-to-day care, a series of new professions has evolved to deliver specific treatments or technologies, such as the dialysis technician, or respiratory technician. As the use of new technologies has increased, so has the importance and responsibilities of these specially-trained health care personnel who have become integral parts of the team. Examples of the team concept of care in respiratory care and in nutrition support follow:

Respiratory Therapy

Respiratory therapy or mechanical ventilation has as its major goal the rehabilitation and restoration of the patient to his "fullest potential" (Hodgkin, 1983), and exemplifies the interaction of technology development, cost containment and training of specific personnel to use the technology and the interaction among different combinations of manpower in various sites of care.

Dr. Alvan L. Barach was a pioneer in the use of respiratory therapy in hospitals for treatment of lobar pneumonia in the 1930s and 1940s. He developed the use of portable oxygen bottles in the 1950s for relief of dyspnea during activity which led to studies in the United States and the United Kingdom on the "effectiveness of long-term oxygen in reversing pulmonary hypertension and secondary polycythemia." (Petty, Nett, 1983). Positive results from these studies encouraged investigations in the 1960s and 1970s into the value of oxygen therapy for patients with chronic obstructive pulmonary disorders (COPD), again with positive results. At the same time, development of more convenient and efficient methods of obtaining and storing oxygen continued, thus expanding home use capabilities (Petty, Nett, 1983).

As with many technologies, their general availability and that of trained manpower utilizing the technology are considered stimuli to utilization, particularly where third-party payments reduce the immediate costs to the consumer (Weimer, 1983). The role of respiratory therapists, a relatively new type of health manpower, has expanded during the past 10 years, especially because of lack of other appropriately trained medical personnel in small hospitals (Gracey, 1982).

In health care, many associations with interest in specific professions seek to develop standards. While these standards are not always subsumed by institutions such as hospitals, they do influence use of services and personnel. The standards developed by the American Association for Respiratory Therapy (AART) are not necessarily accepted by hospitals.

In accordance with the Administrative Standards for Respiratory Care Services and Personnel promulgated by AART, the majority of respiratory care services in hospitals operate under the medical direction of a pulmonary physician or an anesthesiologist (AART, 1983). However, the day-to-day responsibility for treatment lies with the non-physician director who is ideally required to be a Registered Respiratory Therapist under the standards set by AART, although provision is made for individuals with lesser credentials in respiratory therapy to serve in this capacity where circumstances warrant and where appropriate additional training and experience can be demonstrated. Directors of respiratory care services are "responsible for the establishment of standards, and...the quality, quantity, and efficacy of care provided..." In addition, the standards require that job-related continuing education opportunities be offered and documented for all personnel employed by the service (AART, 1983).

It should be reiterated that these recommendations and standards come from the association of personnel providing the services rather than from an independent body with no proprietary interest.

The health costs of chronic bronchitis and emphysema in 1977 were an estimated $1 billion in direct costs, $3.8 billion for morbidity, and $900 million in costs associated with mortality (Hodgkin, 1983). Add to these costs associated with asthma and other respiratory obstructive and restrictive disorders, and it is obvious why efforts to decrease the burden of health care costs are being encouraged. While there is no evidence that participation in a pulmonary rehabilitation program will extend life expectancy, restoration of the ability to function in the activities of daily living could decrease hospital and other medical costs (Hodgkin, 1983).

An estimated three million Americans suffer severe physical impairment due to restrictive or pulmonary processes or chronic obstructive pulmonary disease (COPD). Between 50,000 and 100,000 experience severe lack of oxygen at rest which is exacerbated by exercise. This is the potential population for use of oxygen therapy, although the benefits-cost ratio is by no means the same for all persons (Luce, 1983).

Respiratory therapy was mostly provided in the institutional setting until the early seventies when development of more portable equipment, together with reimbursement incentives, made home care a more feasible alternative. Respiratory care in the home is a team effort in which the patient or his family play major roles. As in all home medical care, the original prescription comes from a physician, but it is the home health or visiting nurse who coordinates the contributions of each member of the team (Make et al, 1984) (Weimer, 1983), which generally include, in addition to the physician and nurse, a respiratory therapist, physical therapist, occupational therapist, and a social worker (Make et al, 1984) (Petty, 1982) (Malkus, 1976).* Before home therapy is instituted, consultations may be held with physicians and other personnel trained in rehabilitation, clinical nutrition and psychiatry or psychology.

The majority of patients with chronic obstructive pulmonary disease are elderly (Weimer, 1983) (Roselle et al, 1982). They may have poor eyesight, be hard of hearing or suffer other infirmities that may impede the success of a home ventilator care program. However, advance planning that includes both the patient and family may lead to successful rehabilitation. Home care has been shown to improve the quality of life for the patient (Malkus, 1976) (Gilmartin, 1983), while reducing hospital stays (Fischer, 1982) and readmission rates--and hospital respiratory therapy costs of care (Weimer, 1983)(Fischer, 1982).

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* Interestingly, Medicare does not cover the services of a respiratory therapist under the home health benefit, although 80 percent of the cost of oxygen equipment is covered under Part B.

Nutrition Support

Some degree of malnutrition is estimated to affect 30 to 50 percent of all hospital patients (Nathanson, 1984). Nutritional deficiencies may be present before the patient enters the hospital or may be a consequence of procedures performed during the hospital stay. Other patients may be unable to ingest or digest food through the mouth. In 1982, two million persons or five percent of all hospital admissions received enteral nutrition and 200,000 or .05 percent underwent parenteral nutrition (Nathanson, 1984). In one hospital, whereas 30 percent of admissions were 60 years or older, 50 percent of those receiving intensive nutritional support were 60 years or older (Steffee, 1980). In nursing homes, the use of tube enteral nutrition is quite common whereas parenteral nutrition is rare.

The health professionals involved in assessment and treatment of malnutrition in patients form an interdisciplinary team that includes physicians, nurses, pharmacists, and dietitians. The standards for nutritional support of hospitalized patients recently promulgated by the American Society for Parenteral and Enteral Nutrition (ASPEN) require that a nutrition support service be directed by a physician with appropriate training or experiential knowledge in the area of nutritional support, and should include "a registered nurse, a registered dietitian and a registered pharmacist each also having qualifications in the area of specialized nutrition support" (ASPEN, 1984). Like respiratory therapy, nutrition support personnel standards are not the work of an independent body with no proprietary interest in the technology.

While nutritional support is provided by multidisciplinary teams with training in nutrition, little formal training in nutrition has been provided to some of the professionals on the team except for nursing personnel. A 1983 survey of nutrition education in 264 baccalaureate nursing schools showed that nutrition is an integral part of the curriculum. Time spent on nutrition education averaged 32 hours. About half of the baccalaureate programs had required courses, the remainder integrating the material into other courses or offering elective courses within the nursing program or in other disciplines.

Most of the teaching is conducted by dietitians or nurses. "The nutrition content of basic nursing education includes: normal nutrition for the infant, child, adult and aged client; the iatrogenic effects of malnutrition; therapeutic diets used with disease; and the therapeutic effects of enteral and parenteral nutrition (Crocker, 1985)." Nutritional assessment is stressed in most of the programs surveyed, but the author found that there is insufficient emphasis on the need for interdisciplinary cooperation and understanding of the roles of other health professionals on the nutritional support services team.

A previous survey of nurse members of ASPEN showed that the majority acquired their specialized knowledge through "informal means," rather than through graduate training programs (ASPEN, 1985). In 1984 the National Board of Nutrition Support Certification was created. This organization developed a certification program for nurses; the first examination was given in June 1985 to 100 applicants. Other continuing education opportunities are offered through ASPEN and through courses at Harvard University, the University of Pennsylvania and other universities.

ASPEN has developed general minimum standards for practice in nutritional support in the hospital, for home care and for nurses. The Society is currently working with the American Society for Clinical Nutrition and the American Medical Association to develop an accreditation policy statement on nutritional support to be proposed for inclusion in the Hospital Accreditation Manual of the Joint Committee on Accreditation of Hospitals (ASPEN, 1985).

Reimbursement and Health Benefits Coverage

Payment or reimbursement policies strongly influence the use and sites of health care services. Recent changes in public and private reimbursement policies, made in an attempt to contain rapidly rising medical costs, are having a profound impact on the use of life-sustaining technologies, where they are administrered and by what types of health care personnel. Since most of the over 65 population are enrolled in Medicare, the federal government has the powerful ability, through its reimbursement mechanism, to advance or inhibit the use of technologies and to control the types of manpower that administer them.

Medicare Reimbursement

Hospital Care

Hospital care is the most thoroughly financed of all health services with more than 90 percent of the reimbursement made by public and private third-party payments (HCFA, Fall 1984). However, recent changes in public and private reimbursement policies are changing incentives for use of hospitals as sites of care and services used within them. Three changes have occurred:

- A shift in Medicare reimbursement from a retrospective reasonable cost basis to a prospective payment system (PPS) based on diagnostic related groups (DRGs);
- A ~~detachment of Medicaid hospital payment from Medicare methods and increased flexibility by the states to determine payment methodologies;~~
- In 1981 Congress changed the requirement that states had to follow the Medicare method of paying for hospital costs on a retroactive reasonable cost basis. States were able to determine their own payment methodologies with much greater flexibility than previously. The majority of states now pay for hospital care prospectively either on a per diem or per case basis;
- An increase in negotiated rates and discounts by private payment programs.

For the elderly population the Medicare changes will have the greatest impact. Since the DRG reimbursement method has been in effect for only two years there are few data on the impact of DRGs on hospital care. However, emerging anecdotal evidence indicates:

- Patients are released sooner and sicker (Hughes, 1982);
- Admissions to nursing homes may increase;
- Patient care settings are shifting from acute to less-acute and non-acute settings;
- Diagnostic in-hospital workups may become more limited (Maples, 1985);
- Hospital readmissions are encouraged (Champlin, 1985).

The prospective payment system reflects the state of medical technology practiced in 1983, the year PPS was implemented. While an update of DRGs is required at four-year intervals, the result may be a slowing of the introduction of new technology and a slowing of the use of technologies that were just beginning to expand when DRGs were introduced.

Some critics of PPS believe the system will provide a disincentive to hospitals to provide certain high technology services to Medicare patients, thus rationing certain types of care to elderly patients. One study found that for patients in diagnostic categories such as circulatory, respiratory and digestive diseases, the hospital may profit when treatment occurs in non-intensive care units and suffer losses for days spent in intensive care units (Bone et al, 1985).

A strong financial disincentive exists, then, for hospitals to care for patients who require the use of extended intensive care. This presents a dilemma for hospitals: as pressure mounts to release patients quickly and to provide services in non-hospital settings, the inpatient population becomes more acutely ill. An acutely ill population probably requires increased nursing staff ratios, more technology utilization and more physician services (Bone et al, 1985). The effect on the use of allied health manpower is unknown and will depend in part on the services needed. Critics also claim that DRGs don't account for psychosocial aspects of hospitalization and will affect staffing patterns for these services (Champlin, 1985).

On the other hand, there could be mixed effects on technologies for the terminally ill elderly, such as respiratory therapy and parenteral nutrition, if provision of these services in the hospital pushes the cost above the prospective rate for the diagnostic category. The favorable consequences could include reduction in the inappropriate and unnecessary use of these technologies; the unfavorable influence may be withholding the technology when there may be benefits.

Nursing Homes

Medicare was designed for acute care, not for long-term care. By law Medicare pays for 100 days of skilled nursing services per illness episode, but users of benefits average about 27 days of covered care per year, and only a portion of nursing home beds are Medicare-certified (Kuntz, 1984).

Medicare criteria for payment are complex, restrictive and subject to variation in interpretation by claims reviewers (Kuntz, 1984). For example, while IV therapy and tube feedings are covered, coverage of other technologies is unclear (Fackelmann, 1985). Furthermore, the level of reimbursement to SNFs may not be sufficient to provide incentives to these facilities to perform technology-intensive procedures. As hospitals feel pressure to discharge patients to non-acute care settings and transfer patients who require these technologies and long stays to SNFs, the probability increases that patients will not meet the criteria for Medicare payment and will spend down into Medicaid eligibility. Often Medicaid payment is too low to cover the care of patients requiring support technologies such as TPN (Champlin, 1985).

Home Health Care

Home health care is an excellent example of how the Medicare reimbursement policies of the federal government can affect the use of technologies and health professions manpower. Medicare coverage of home health services is restricted to homebound persons under the care of a physician and who require "intermittent" skilled nursing, physical or speech therapy (Coleman, June 1985). The definitions and restrictions limit the use of therapies such as IV antibiotics and respiratory therapy in some settings.

Under the home health benefit, Medicare covers:

- Occupational therapy;
- Part-time intermittent services of home health aides and nursing care;
- Medical supplies and equipment provided by a home health agency including 80 percent of the cost of medical equipment such as oxygen equipment under Part B insurance.

Medicare does not cover:

- Homemaker services;
- Full-time nursing care;
- Drugs;
- Blood transfusions and other biologicals;
- Respiratory therapists (nursing services for oxygen therapy are reimbursed);
- Nutritional/dietary professional services and dietary supplements.

On a number of issues the federal government has not issued or clarified Medicare regulations or it has changed regulations frequently to meet technology changes. The home health care field has been unstable. Examples of different treatment of home delivery of high technology services for the terminally ill elderly are IV antibiotics and total parenteral nutrition and enteral nutrition (TPN/EN).

IV antibiotic therapy is covered by Medicare in hospitals and in nursing homes, but not in the home. The Medicare home health benefit specifically excludes antibiotics as drugs/biologicals and in addition, IV antibiotics patients may be ambulatory. Nursing services could be covered for IV antibiotic treatment, but often this technology requires more frequent medical supervision than intermittent care (HCFA, personal communication).

Coverage of total parenteral and enteral nutrition is quite complex.

Total parenteral nutrition and enteral nutrition can be covered in the home under the prosthetic device benefit, but not under the residence home health benefit. In the case of TPN, the pump, tube and nutrients may be provided on an outpatient basis under Part B; for enteral nutrition, tubing and nutrients are covered under the prosthetic device benefit.

The home health benefit does not provide coverage for prosthetic devices. Almost all home health services are provided under Part A. An approved home health agency can offer TPN/EN, but then the organization ceases to function as a home health agency, becoming a prosthesis supplier. Coverage may include the infusion pump (as durable medical equipment), and tubing (as home health medical supplies). The home health benefit does not include coverage for the costly nutrient solutions nor are solutions covered as durable medical equipment (HCFA, personal communication).

Hospice

Hospice benefits are relatively new in the United States, and provision of hospice benefits by public and private third-party payors is even more recent. The concept of hospice is basically antithetical to the use of technology-intensive services for the terminally ill.

The concept of hospice is to provide maintenance care, counselling, social support and pain relief for the terminally ill, rather than active treatment. Life-sustaining measures such as mechanical ventilation, or resuscitation, will usually only be initiated at the request of the patient or family.

For the elderly covered by Medicare, the patient must make a choice between hospice and regular Medicare benefits. If hospice is chosen, all care is provided by hospice.

Durable Medical Equipment (DME)

Durable medical equipment is needed for dialysis, mechanical ventilation and nutrition support. Until recently, 90 percent of DME was rented. On February 1, 1985, Medicare regulations were revised and all equipment with a cost of less than $120 must now be purchased. ~~More expensive equipment must be purchased.~~ In addition, if expected rental use over time of more expensive equipment will cost more than it would to purchase, the equipment must be purchased. Medicare and private insurance reimbursement is generally at the 80 percent level of reasonable costs with the balance paid by the patient (Evashwick, 1985).

Approximately half of Medicare's DME costs are for oxygen and equipment. As in other parts of the health industry mergers and acquisitions are favoring large national companies that provide DME.

Health Benefits Coverage

Private Insurance

Most of the over-65 population is eligible for Medicare, but policy changes implemented by the federal government in recent years are shifting more of the burden of health care costs to the private sector.* Two changes--the gradual rise in the minimum age for Social Security eligibility and the requirement that employer-sponsored health insurance plans of the working aged be the first payor--mean that a greater number of elderly will depend on private health insurance (Stein, 1984) (Changing Times, 1983).

Employer-sponsored plans are an important source of medical care protection for retirees and like Medicare, the cost of employer-sponsored plans has been increasing rapidly. The number of retirees eligible for supplemental employer-sponsored benefits is growing and is contributing to employers' rising costs for health insurance benefits (Mercer Public Sector Report, 1984). Most companies pay premiums for retirees' health insurance out of current income instead of funding the program for the future. Some believe that the unfunded liabilities of these plans are a time bomb, particularly in mature, basic industries (Business Week, 1984).

The design of health insurance benefits and payment policies (i.e., the use of deductibles and coinsurance) obviously influence the use of services and the sites of service delivery. As distinguished from general benefit design (e.g. hospitalization, home care) specific service use is also influenced by coverage policies. If a public or private plan determines that a specific service or procedure or device is not safe and effective or medically necessary or experimental, the insurance plan will not reimburse. Conversely, benefits and payment policies can encourage certain types of behavior. Employers have been redesigning benefits to control cost increases, including shifting care out of hospitals, encouraging enrollment in health maintenance organizations and actively using various utilization review mechanisms, such as preadmission certification (Work in America, 1985).

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* Currently, about one-half of the elderly population covered by Medicare have supplemental benefits through their employer or through purchase from groups like the American Association of Retired Persons (AARP). These policies vary widely in scope.

Public Insurance

During the last five years Medicare reimbursement policy has influenced sites of care and service delivery. The shift from retrospective reasonable cost reimbursement of hospitals to prospective DRG reimbursement has stimulated early discharges from the hospital to alternate sites of care, ~~outpatient~~ as well as more extensive pre-hospital~~ization~~ use diagnostic testing ~~and-use-of-different types-of-health-care-personnel-as-caregivers.~~ Changes in sites of care have shifted the use of different types of personnel. For example, nurses and aides provide the bulk of home health services with lesser physician contact with the patient than in hospital settings.

Deductibles and coinsurance also influence use. The classic example cited is full payment for lab and X-ray in the hospital, but coinsurance if the service is rendered out of the hospital. Medicare has deductible and coinsurance provisions, duration limits and does not cover certain types of service or products such as drugs out of the hospital . Deductibles and coinsurance payments by beneficiaries for hospitalization have been increased over time, as have premiums. Home health benefits have been liberalized.

Long Term Care

Payments for long-term care, particularly for nursing home care, now represent the largest uninsured or out-of-pocket expenditure for the aged (Meiners, 1982). Significant funding for long-term care is available under Medicaid, but unless the elderly are already eligible they must spend down virtually all their assets to qualify.

The private insurance sector provides only limited coverage for nursing home and other long-term care services, but insurance companies are showing an interest in further developing such coverage. Although a minority of elderly are poor and most will not require nursing home care for protracted periods, a significant minority, particularly those requiring dialysis, respiratory therapy, TPN, or ventilation could benefit from such coverage (Meiners, 1982).

Until recently, private insurance has not moved to fill the long-term care gap for the following reasons:

- Some public coverage is available;
- There is danger of adverse selection: only the sick or those who anticipate needs for long-term care will purchase insurance;
- Lack of clear distinctions among skilled, intermediate and custodial care exist and there is overlap between medical and social needs;
- Discrepancies exist between the cost of coverage and income of the elderly (Meiners, 1982).

Manpower Training

The technologies discussed in this paper utilize the services of physicians, nurses, pharmacists, dietitians, respiratory therapists, and various technician personnel associated with the specific technology. Each of these professions has its own requirements for training, certification, and licensure, but all have in common the requirement for clinical training for the personnel involved in patient care. The following discussion briefly describes the training requirements for each type of personnel involved in the technologies, and then explores the impact that prospective reimbursement may be expected to have on the supply of these personnel.

Training

Two of the technologies (dialysis and mechanical ventilation) are treatments for specific disorders of discrete organ systems, and the training for the physicians involved is relatively uniform, differing only in the area of subspecialty training. In dialysis, the supervising physician is a nephrologist, a physician who has completed two years of residency training in the treatment of renal disorders, beyond the required four years of medical school and three years of general internal medicine training. The supervising physician in the respiratory therapy unit is most often a specialist in pulmonary diseases, another subspecialty of general internal medicine requiring two additional years of residency training. Thoracic surgeons or anesthesiologists may also act as medical directors of respiratory therapy units.

Patients who receive antibiotic therapy, nutrition support, or who may require resuscitation have many different diagnoses, and may be under the care of virtually any type of physician. However, where resuscitation measures are required, personnel specifically trained for such situations form a team to respond to the immediate emergency.

Nursing personnel associated with each of the technologies may be graduates of four-year baccalaureate programs, three-year hospital diploma programs, or two-year associate degree programs, and some may have master's degrees. Before specializing in a specific area of nursing, such as dialysis or critical care, most nurses gain one or two years' experience on the general medical and surgical floors of a hospital. To become certified in nephrology, a nurse must demonstrate at least one year's experience in the field of nephrology, in addition to passing an examination. Certification for critical care nurses requires at least one year's experience in a critical care unit. Preparation for certification examinations may be obtained through in-service, on-the-job training, or through special hospital-sponsored seminars, or programs provided by the professional associations, or schools of nursing.

Licensed practical nurses most often obtain their training through one-year programs at trade, technical or vocational schools, although about one-quarter of the programs in 1980 were located in junior and community colleges (Institute of Medicine, 1983). Specialization on their part comes from on-the-job training.

Nurses' aides may attend six-month to one-year programs offered by community colleges, but the majority receive on-the-job training from the institution of employment (Institute of Medicine, 1983).

Respiratory therapists may take one of two routes to becoming qualified in their profession. The respiratory therapy technician is required to take a one-year course of training which focuses mainly on the use and maintenance of the equipment necessary to respiratory therapy, whereas the respiratory therapist takes a two-year course which incorporates many aspects of patient care monitoring and diagnosis related to respiratory diseases. The respiratory therapist is expected to have a much wider range of responsibility than the technician, although in 1978 a Bureau of Health Manpower study found little difference in the tasks performed by each of these practitioners and recommended a single-entry-level generalist position for the profession (Galambos, 1979). Baccalaureate programs, with a major in respiratory therapy, have also been developed, although the four-year degree has not yet become a requisite for certification or registration as a respiratory therapist or a respiratory therapy technician. Although a high school education is the only prerequisite for entry into RT programs, many enrollees come from other health fields, such as nursing or paramedic.

Pharmacy training may lead either to a baccalaureate degree in pharmacy after five years of training or the Pharm.D. after six years which includes a year of clinical residency training. Both degrees are considered entry-level degrees, although the Pharm.D. program was developed to give pharmacists more involvement with physicians in the administration of drugs (Galambos, 1979).

Dietitians may take one of two routes to obtaining recognition by the American Dietetic Association as a Registered Dietitian. They may either follow a university course of study that integrates clinical training throughout four years of academic course work, or they may first obtain a baccalaureate degree in a related field, such as nutrition, and follow this experience with the requisite clinical training.

Technicians are an important part of the health team in dialysis units, with responsibilities ranging from technical procedures and direct patient care to biochemical analyses, observation, and research. The range of responsibilities varies from unit to unit, although the work is always performed under the supervision of a physician or professional nurses. There are few formal training programs for dialysis technicians, and no accrediting agency or requirements. Acquisition of the skills and knowledge necessary takes place through on-the-job training in the dialysis units themselves. Dialysis technicians are not required to be licensed, registered, or certified, although a voluntary certification program is offered by the Board of Nephrology Examiners (Hopke, 1984).

Trends in Hospital Staffing under Prospective Payment

It has been expected that the change to prospective payment under Medicare would lead to cutbacks in numbers of personnel employed in hospitals, and that these cutbacks would occur mainly among the less highly-trained personnel. The reasons for this include the fact that patients are being discharged earlier in their course of treatment to reduce lengths of stay, so that patients retained in the hospital tend to be sicker, and require higher levels of care. The fact that there is overlap in the training of personnel at different levels means that more highly-trained personnel are able to perform many of the tasks of lower level personnel, whereas the reverse is not true. Thus, hospitals may seek to contain costs by reducing the number of lower-level personnel and requiring the more highly-trained personnel to be more productive. The following statistics suggest that in some areas, particularly nursing and dietetics, hospitals are acting in this manner. These changes in personnel also affect hospital training programs.

In 1983, U.S. hospitals employed 3.7 million people in all categories of health care, a one percent increase from the total employed in 1981, but a decrease of one percent from the total in 1982. There was a ten percent decrease in the number of physicians employed by hospitals from 1981 to 1983. The number of registered nurses increased ten percent, but licensed practical nurses decreased two percent. Although the number of other nursing service personnel was not available for 1983, from 1980 to 1982 there was a 22 percent decrease in their numbers (HRSA, 1985).

The number of pharmacists and pharmacy technicians increased each year from 1980 to 1983, but the rate of increase for each category shows a decreasing trend. The number of employed dietitians decreased each year from 1981 to 1983, resulting in a one percent decline in numbers during the period. The number of dietetic technicians (who provide much of the nutritional counseling to patients) decreased 14 percent from 1981 to 1983, following a single year decrease of 12.7 percent from 1980 to 1981.

The number of respiratory therapists employed by U.S. hospitals has been increasing steadily since 1980 at an average rate of about 7.5 percent per year. The number of respiratory therapy technicians has also been increasing, but at a much slower rate (HRSA, 1985).

Overall, the number of hospital personnel has increased since 1980, but the rate of increase has been declining each year. For example, from 1980 to 1981 there was an overall increase of 3.4 percent in the number of personnel employed; from 1981 to 1982, the increase was 2.2 percent, but from 1982-83, the number decreased by 1.0 percent. The number of personnel employed per admission declined sharply from 1982 to 1983 (American Hospital Association, 1985). The large numerical decrease in nursing service personnel except for registered nurses accounted for most of the overall percentage decrease in employed personnel.

Effects of Reimbursement Policy on Health Manpower Training

Introduction

Support of training of health manpower comes from numerous revenue streams. These revenue sources vary by type of training program and site of training. Sources include state and county support for colleges and universities, tuition, biomedical research and patient care funds. Hospitals have been the traditional training sites for much of the clinical training for medicine, nursing and allied health professions, although to differing degrees among and within each of the professions. This training has been financed primarily from patient care funds. Financing of health professions education in non-hospital training sites has been far less generous and has been based traditionally on a quid pro quo of service, with faculty supervision support provided by the educational institution.

From its inception Medicare has provided direct identifiable support for graduate medical education for physicians, for diploma nursing schools operated by hospitals and certain allied health programs operated by hospitals. There is no national information on the extent of these costs or financing of these costs. Furthermore, support of clinical training may not be separately identified in hospital financial statements and has been subsumed in the basic cost or charge structure of the hospital.

Changes in Reimbursement

Recent changes in reimbursement will have a profound effect on support of clinical training. While Medicare pays for direct education costs, the program also reimburses for indirect medical education costs, i.e., the additional costs incurred in training such as the ordering of additional tests for the more severely ill patients generally found at teaching institutions. However, reductions are expected in terms of explicit direct support and indirect support.

In the first instance, proposed changes in Medicare direct support for residency training will reduce the total amount of future support and limit the ability of hospitals to maintain levels of training. Furthermore, indirect support now provided for residencies may have been used by hospitals to cross-subsidize certain underfinanced specialties in primary care and nonphysician training programs. Reductions in this support are proposed in the pending budget reconciliation legislation.

Hospitals have provided education support for a number of reasons including recruitment and on-the-job orientation. Other factors that influenced the support of these programs were quality of care, the institutions' overall education mission, prestige, community orientation related to local college programs and substitution for staff slots or additional services. Prior to DRG reimbursement and the changes occurring in Medicaid and private health plans, costs associated with such program support could be met.

The HRSA report indicates that hospitals are now actively reviewing the training programs in relation to productivity and efficiency of operations.

DRG payments provide incentives to reduce costs by diagnosis, affecting those training programs in which costs are not separately identified for direct support. Often, the hospital central administration has not been aware of the number of clinical affiliations and the actual costs of programs because of the decentralization of program decisions to department levels, and cost accounting practices which do not identify the education costs and because costs were not a primary concern.

A recent survey by the Committee on Allied Health Education and Accreditation of the American Medical Association showed that 44 percent of the more than 2,000 allied health education programs surveyed had experienced a negative effect from the prospective payment system. Many programs had been terminated or had plans to terminate, while others reported changes in the patterns of clinical affiliations (Ginsburg, 1985).

The Bureau of Health Professions of the Health Resources and Services Administration recently conducted site visits to programs in Baltimore, southeastern Florida, Chicago, and northern California to assess the impact of the prospective reimbursement payment system on clinical affiliates and the training programs in medicine, nursing, social work, pharmacy, and allied health fields including dietetics, and respiratory therapy. The BHP site visits found that changes in Medicare reimbursement have led to "decreased patient census, shorter lengths of stay, sicker patient populations, increased emphasis on staff productivity resulting in changes in both the number and mix of staff, and changes in the services offered by the hospital, including contracting out of certain ancillary changes."

As a result, clinical programs in all professions are reporting problems in providing the appropriate number and mix of patients for students to obtain the necessary clinical experiences for completion of training. Additionally, staff employed by the hospitals have less time to spend in teaching or supervising students (of particular concern in the allied health fields where much of the clinical training and supervision has traditionally been provided by hospital staff, usually at no charge to the training program), and hospitals are beginning to require payment for staff time spent in educating students, or are reducing their involvement in teaching programs. As a result, "students are graduating without the necessary hands-on experience expected" (Ginsburg, 1985).

While educational programs are attempting to expand their clinical sites, the financing of education in alternative sites is difficult because patient financing mechanisms have not traditionally paid for training in non-hospital sites. The growth of competition has also constrained the willingness of organized outpatient systems like HMOs and home care agencies to incur education costs.

The HRSA study indicates that growing competition among professions for clinical access in hospitals is particularly affecting clinical dietetics, and respiratory therapy (Ginsburg, 1985).

Shift in Settings of Care of the Elderly

Two factors are contributing to the growing movement to shift care from hospital to non-hospital settings: the growth of the elderly population and cost containment measures for health care in the private and public sectors. A recent report by the Population Reference Bureau states that about one in four elderly persons now needs nursing home care or special care at home (Fackelmann, 1985). By the year 2020 the number of elderly people needing nursing home care or home health services is expected to double largely because of the rapid growth of the over 85 population segment.

The advent of DRGs and prospective reimbursement has forced hospitals to explore opportunities for out-of-hospital treatment and care. The federal government, through reimbursement changes under Medicare, has encouraged the development and growth of alternative sites of care. For example, a relaxation of some of the criteria for the home health benefit has stimulated growth in that industry. The health benefits insurance sector has also affected, through its payment mechanism, the use of non-hospital health care settings.

The interest in out-of-hospital care for the terminally ill has some historical basis (dialysis) but other technologies that formerly were used exclusively in the acute care hospital, such as respiratory therapy and ventilation and parenteral nutrition therapy are now moving into nursing homes and the home. A nurse for a home care nutrition company states, "Procedures once performed only in hospitals now are taught to patients and their families...Lay people can learn to manage central line catheters including the operation of any type of infusion pump, intravenous feedings, except for changing the peripheral catheter,..." (Geriatric Nursing, 1985).

As care moves out of the hospital, the nursing home and home care industries have been growing rapidly and are characterized by:

- o Future strong growth potential, with the possible exception of dialysis centers;
- o Increased competition and the entry and expansion of for-profit companies serving these markets;
- o Shifts from highly fragmented, local entities to national chain organizations and reorganization by hospitals to extend their business opportunities to out-of-hospital care.

Manpower use and needs will be strongly influenced by these developments and by the introduction of new technologies and new and varied sites of care.

Home Care

The home care market is varied, encompassing three types of services: durable medical equipment, routine home care (primarily nursing and physiotherapy) and high technology therapy (Evashwick, 1985). The entire home care market has grown rapidly since 1980 and growth will continue. Estimates are that market volume will increase from $2.7 - 5.2 billion in 1980 to $8 - 19 billion in ~~1980~~ 1990 (Fackelmann, 1985).

Much of the growth has been a result of several changes made by Medicare in 1981. These changes included the removal of the requirement that a person be hospitalized for at least three days before becoming eligible for home care benefits. Home health services could be reimbursed without satisfying a deductible and limits on the number of all medically necessary home visits were lifted (Coleman, 1985).

With the pressures to restrain hospital admissions and encourage early discharge, home care industry experts predict the high technology segment of home care will grow rapidly (Fackelmann, 1985). Estimates include:

- o Home IV antibiotic therapy will become the most lucrative area for home care providers in the next few years, growing from $15 million in 1983 to $400 million in 1988 (Kuntz, 1984);
- o Total parenteral nutrition (TPN) is expected to grow at a slower but still substantial rate, increasing from $170 million in 1983 to $400 million in 1988 (Kuntz, 1984).

At the end of 1984, there were about 5,337 home health agencies and that number is expected to grow about 80 percent to 8,000 by 1990 (Punch, 1985). There has been a shift from not-for-profit agencies to investor-owned home care companies with much of the growth in the home health care market coming from the for-profit agencies whose numbers increased fivefold from 1980 to 1984 (Punch, 1985).

The number of not-for-profit visiting nurse associations (VNA), historically the caregivers to individuals at home, has remained unchanged for several years. VNAs have tended to remain in traditional nursing services and have generally not expanded into the high technology areas (Punch, 1985).

The number of hospital-based home health agencies has also grown very rapidly, reaching more than 800 in 1984 (Punch, 1985). Hospitals, in response to changes in reimbursement and health insurance benefits, are examining business opportunities to extend their influence beyond their walls. Most hospitals develop Medicare-certified home health agencies. Generally, fifty to ninety percent of a Medicare-certified home health agency's clients are over age 65 (Punch, 1985).

Both for-profit and not-for-profit hospitals are forming home care departments in several ways, including:

- o Establishing a home care department within the individual hospital;
- o Forming a subsidiary or acquiring existing home care agencies;

- Establishing joint ventures with existing agencies or geographically proximate hospitals (Kuntz, 1984).

In addition, some proprietary home care companies, e.g., Abbott, may act as consultants to hospitals that want to develop their own home care companies (Fackelmann, 1985).

As hospitals expand into the home care market in response to shorter lengths of stay and profit-oriented, investor-owned companies stimulate the growth of the home care market, there will be a significant impact on the use of and need for health manpower in the home setting. Historically, nurses, LPNs and home health aides through their participation in public health agencies and visiting nurse associations, were the focal point of home health care programs. Today nurses are still crucial, but other professionals, trained more narrowly in specific techniques such as respiratory therapy, have been added to the health care team.*

At the same time nurses are being asked to administer and monitor more high technology types of services, such as IV therapy. While the physician actually prescribes home health services (or a nurse practitioner can recommend treatment), the physician is not very involved in patient care (Coleman, June 1985). However, the growth and use of high technology are partially dependent on physician education and practice patterns. For example, if IV antibiotic therapy is commonly used in the hospital and the physician received extensive training in the use of this therapy (perhaps during residency), the physician will be more likely to prescribe it for home use (Evashwick, 1985). The fact that home infusion therapy is the fastest growing segment in the home care market indicates the increasing acceptance of the therapy by physicians.

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* The training of these personnel varies widely by technology in length, skills and knowledge of geriatrics.

With shorter hospital stays, demand for health care manpower trained in home services is likely to increase, but there may be problems in shifting existing trained manpower to the new environment. Clinical knowledge generally transfers well from a hospital to a home setting, but a barrier to easy manpower transfer may exist:

- Lack of interaction with colleagues and advisers may make home care a lonely job;
- Supplies and equipment may not be readily available in the home setting;
- Documentation requirements are unique in a home care setting, requiring the nurse or caregiver to clearly document the need for each service, or risk losing third-party reimbursement (O'Donnell and Church, 1985);
- Lack of uniform payment policies reduce the flexibility of transfering personnel from large institutions to smaller units;
- Difficulty in assuming adequate physician supervision out of the hospital.

Dialysis Centers

Dialysis centers are a classic example of the movement of services from a hospital to a non-hospital setting and the effect of reimbursement policy on the use of technology. The dialysis industry is thought to be "mature" and is also characterized by the increasing dominance of investor-owned chains.

In the late 1960s and early 1970s dialysis was an experimental, hospital-based therapy with no third-party financing. In 1972 Medicare benefits were extended to patients with end stage renal disease (ESRD). Because the payment structure allowed for reimbursement in out-of-hospital centers, free-standing dialysis centers were opened. Later home dialysis was allowed; many commentators have noted that Medicare payment practices actually impeded the development of home dialysis. Almost all dialysis centers have been offering home care since 1983 when Medicare began reimbursing home care at the same rate as dialysis center treatment.

Unlike hospital-operated dialysis centers, dialysis chains have grown, steadily in the past decade (Richman, 1985). Nine chains treated 29 percent of the nation's hemodialysis patients in 1984, up from 26 percent in 1983. While the number of dialysis patients is expected to grow 5 - 11 percent from 1985-86, dialysis is not a big growth business (Richman, 1985). Reimbursement is considered by the providers to be relatively low and so has held competition in check. The chains are expected to grow by enlarging existing centers or through acquisitions (Richman, 1985).

Pressures to contain rising health care costs are expected to make dialysis centers less profitable and probably more competitive. Centers may increase reuse of supplies or alter patient-staffing ratios. Some centers may replace registered nurses with less expensive technicians where state law permits it (Ruhe, 1984).

Nursing Homes

The growth of the very old, over 85, population and pressures for early hospital discharge have had dramatic effects on the nursing home industry. Reimbursement pressures, particularly Medicaid limits and restrictions on new construction of nursing homes imposed by state certificate of need (CON) programs have also had a significant impact on the industry. Like the home health care and dialysis industries, large proprietary companies are increasing their influence in the marketplace, primarily through the acquisition of smaller chains and individual homes (Punch, 1985).

The nursing home industry is experiencing a severe shortage of beds due not only to CON barriers, but also to construction costs. The number of beds being built declined 9.8 percent between 1983 and 1984, from 2045 to 2007 (Punch, 1985). The bed shortage will continue to stimulate the further growth of the home health market as nursing homes expand to provide additional services such as durable medical equipment and respiratory therapy to meet outpatient needs (Punch, 1985). Nursing homes, especially the chains, are beginning to develop lifecare centers, retirement centers and other congregate living arrangements in an attempt to diversify their business (Punch, 1985).

At the same time nursing homes are beginning to provide a higher level of care than in the past. Nursing homes will offer more ancillary services such as respiratory therapy and may or may not provide them at lower cost than hospitals. Some nursing homes are establishing sub-acute units which will offer a middle level of care between acute and long-term care. Sub-acute units will give more skilled nursing care than nursing homes offer now. At least one nationally known proprietary chain is increasing the size of its nursing home staff and is training employees to provide higher levels of patient care (Punch, 1984).

Medicare prospective payment has forced a closer relationship between nursing homes and hospitals. Like nursing homes, hospitals are exploring the development of sub-acute units, but unlike nursing homes, as a way of filling excess beds (Punch, 1985). It is generally acknowledged that many nursing homes are not adequately staffed currently to provide more acute services. For nursing homes to admit greater numbers of patients who need these services would require increased staffing ratios, staff training and more sophisticated equipment (Braunstein and Schlenker, 1985). The amount of movement of existing personnel at each occupational level from hospitals to other care settings is unknown.

Licensure and Standards

While virtually all commentators agree that some degree of standard setting licensure and certification is needed in health care to protect the life and safety of patients, there are continuing controversies over the degree of regulation, what should be regulated and the frequency of licensure and certification. review. One of the greatest controversies revolves around licensure and certification of health manpower. By and large, state by state policies govern licensure, private agencies govern accreditation and certification but frequently public programs like Medicare subsume these programs, as a basis for reimbursement services.

Medicare from its inception has had standards of participation for institutional providers of care like hospitals, home health agencies, dialysis centers, extended care facilities and hospitals. However, except for hospitals and dialysis centers, not all institutional providers seek Medicare certification.

Manpower

All fifty states license physicians, registered nurses, licensed practical nurses and physical therapists. Some states also license nurse practitioners, social workers, and occupational, speech and respiratory therapists. Homemakers and home health aides are not generally licensed. Dietitians and most therapists are certified by passing a national test sponsored by the particular occupational group (Coleman, 1985).

Frequently the manpower specialty itself seeks certification and licensure to "professionalize" the occupation and set entry barriers to maintain and enhance income and prestige. While there is little disagreement about the need for licensure of certain personnel such as physicians and/or nurses where certain levels of competence are required to protect the life and safety of individuals, certification and licensure of a number of entry-level allied health occupations are questionable.

Hospitals and Nursing Homes

Hospitals have had a voluntary accreditation process since the beginning of this century. Medicare incorporated the standards and accreditation process of the Joint Commission on Accreditation of Hospitals (JCAH). While some nursing homes are subject to JCAH accreditation, they are generally certified by states.

Home Care

Thirty states require home health agency licensure. However, standards vary widely. To qualify as a Medicare provider, agencies must be certified. Certification means the agency must offer at least two services, one of which must be skilled nursing care. Agency staff must meet state requirements for their respective occupations (Coleman, June 1985).

Accreditation of home health agencies is a voluntary process with the following organizations accrediting these agencies:

- Joint Commission on the Accreditation of Hospitals (reviews number of staff, existence of professional nursing and one therapeutic service);
- National League for Nursing/American Public Health Association;
- National Home Caring Council.

Hospice

As of January 1985, 18 states and the District of Columbia had hospice licensing laws. Hospices which operate as part of a home health agency, long-term care facility or hospital are regulated as part of those institutions. JCAH also has a hospice accreditation program, and the National Hospice Organization has set voluntary standards. Medicare certifies hospice. However, many hospices don't seek certification primarily because of the Medicare reimbursement policy. This policy limits payment for the service to 210 days. When the days are exceeded Medicare requires the hospice to continue care without payment (Coleman, February 1985). Some private insurance carriers require that hospice meets JCAH or NHO standards, and all carriers require compliance with state and local laws.

Manpower for the Five Technologies

Four of the five life-sustaining technologies are not subject to any specific federal or state standards other than those imposed on the agencies providing the services, or on personnel, depending on specific state law. Many of the personnel providing these services are entry-level allied health personnel who are not normally subject to certification or licensure. However, there are standards for end stage renal disease centers, although not for home dialysis.

While there may be standards for manpower occupations that deliver certain technologies frequently, the efficacy of some technologies or procedures has not been adequately assessed. For example, dialysis is a proven life-saving and life-extending technology, but CAPD is still surrounded by some controversy. The widespread availability of dialysis and its profitability may have been a disincentive to increased use of transplantation. Respiratory therapy can improve the quality of life for many patients but has been found to be an overutilized technology with no proven benefits for a large number of patients (Gracey, 1982). There has been no systematic assessment of the efficacy of EN/TPN for different diagnoses.

Technology Assessment

During the last 40 years remarkable advances in technology have extended life and reduced disability. Changes in technology have occurred so rapidly that many new procedures are introduced and diffused without systematic evaluation of safety, efficacy, appropriate indications for use and social and ethical issues related to use of the technology.

While the United States was theoretically able to finance the use of all of these technologies, patterns of reimbursement and insurance coverage influenced dispersion, but in an ad hoc rather than a planned fashion. Despite the rising costs of care and the efforts of the public and private sectors to constrain these increases, the search for further advances continues. In addition to public interest in ameliorating or curing disease, corporate interests seek innovation and profits; scientists seek solutions to problems (Bayer, 1984).

Recently public awareness has grown that our society cannot afford the use of all technologies by all people. However, unlike England, we have not had policies to restrict technology by factors of age or diagnosis. Our system of financing and delivery of care and the sociopolitical ethos lead to pressures to make technologies available to all once the technology is diffused (Bayer, 1984).

In the late seventies and early eighties public attention began to focus on the risks associated with technology, the factors affecting adoption of technology and the factors affecting its use. Congress, the Medicare program and the newly developed Center for Health Care Technology recognized the need to develop a systematic approach to the evaluation of technology. Medicare is often the pacesetter for other payers on the adoption of technology (Burns, 1984).

Among the factors that influence the adoption of technology are:

- The complexity of the device or procedure;
- Characteristics of institutions and practitioners, particularly skill levels;
- Characteristics of the environment, financing, market conditions, payment policies (Burns, 1984).

In addition, a number of factors influence patterns of use:

- Training of physicians and their knowledge of specific technologies;
- Increased specialization of physicians and allied health manpower;
- Organization of service;
- Concerns about malpractice;
- Payment policies of public and private insurance programs;
- Industry promotion of products;
- Depth and scope of insurance coverage (Burns, 1984).

Payment policies have been critical in the diffusion and use of technology. Physician fee payments reward practitioners who are in procedure-oriented specialties and who use sophisticated technology. Charges for a technology are generally established at an early stage of diffusion and remain at those levels or rise even when use is simplified and skill levels increase (Burns, 1984).

The effects of hospital payment methods on technology utilization are changing. Under retrospective cost and charge reimbursement there are incentives to expand technology. Without limits on capital investment, diffusion of technology is rapid. The change to DRG reimbursement provides incentives to adopt cost-saving technologies and may impede the adoption of new technologies that are cost-additive within a DRG. Although DRGs are to be recalibrated every four years, the new system can slow the introduction of technology. Also important is the method that will be adopted to incorporate capital costs into DRGs (Burns, 1984).

The physician remains the key determinant in the diffusion of technology. However, payment mechanisms and insurance benefits are constraints at least in the short run. The physician influences amount of care, type of care and sites of care (Burns, 1984).

Most diagnostic technologies, with exceptions such as imaging and skilled procedural technologies such as angiography, are available to all physicians. Therapeutic technologies tend to have use rates directly related to the number of medical and surgical specialists in the population (Shcroeder, 1984).

Public demand also influences the diffusion and use of technology. Liver transplant is an example of public pressure that changed coverage/reimbursement policies. Demography also influences use rates. Those over 65 require more care. Increased success in prolonging life leads to more opportunities for additional care.

Supply of health manpower also affects technology use since the number of providers can stimulate demand. Unlike other nations, there has been no gatekeeper concept in the United States. Patients who are not members of HMOs can self-refer to specialists and even those within HMOs can seek alternative arrangements. Since consumers rarely have adequate technical knowledge about risks/benefits/costs, they must rely on the recommendations of health professionals. The distribution of health professionals, particularly physicians, between primary care and specialties, and the extensive development of subspecialties encourages the use of sophisticated technologies, particularly in the absence of rigorous assessment of the value of specified technologies. The reimbursement levels further encourage the selection of sophisticated procedures even where the value in terms of health status may be marginal (Schroeder, 1984).

The United States has unprecedented capacity in both institutional settings, dispersion of technology and skilled manpower that, combined with the incentives and disincentives in health insurance and payment systems, lead to increased use of certain technologies. Changes occurring in hospital patterns of care without concomitant changes in other delivery systems may merely transfer the problems of appropriate use and volume of technology to other settings.

Regarding the five technologies, systematic assessments and analysis of appropriate use have not been undertaken for respiratory therapy, ventilation, TPN/EN, or IV antibiotics. The rapid growth of technology-oriented home health services, the growth of technology-oriented services in nursing homes combined with the short training periods for allied health manpower who deliver these services can only lead to expanded use if payment for these services covers costs and if the individual physicians who order the specified services believe in the value of the technology and/or benefit economically.

Conclusion

Projecting manpower needs is difficult for these technologies given the rapid changes in organization and delivery of services, health benefits and reimbursement. Since actual provision of the service is provided by lower skilled personnel who are supervised by, or work in teams, with nurses, physicians, and dietitians, the supply will probably respond to market forces. The issue is not availability of personnel but the efficacy of the technology and the content of training that places emphasis on the special aspects of care for the aging.

II. Bibliography

Administrative Standards for Respiratory Care Services and Personnel. An official statement from the American Association for Respiratory Therapy. Respiratory Care 28:8, 1983.

Aiken, L.H., Mezey, M.D., Lynaugh, J.E., Buck, C.R.: Teaching Nursing Homes: Prospects for Improving Long-Term Care. J. Amer. Geriatr. Soc. 33:3, 1985.

American Society for Parenteral and Enteral Nutrition: Standards for Nutrition Support: Hospitalized patients. January 1984, ASPEN, Silver Spring, MD.

ASPEN: A.S.P.E.N. Pharmacy Membership Survey. January 1985.

ASPEN: Report of the Committee on Home and Hospital Standards of Professional Practice. Update, July 1985.

Association of American Medical Colleges. Proceedings of the Regional Institutes on Geriatrics and Medical Education. 1983. Washington, D.C.

Barry, P.P., Ham, R.J.: Geriatric Education: What the Medical Schools Are Doing Now. J. Am. Geriatr. Soc. 33:2, 1985.

Bayer, Ronald, Prometheus Meets Malthus, Business and Health 1:8 July/August 1984, p. 22-25.

Bone, Roger C., Butler, Peter W., Field, Tina, Intensive Care Monitoring in a Cost-Conscious Age, Respiratory Care 30:7, July 1985, p. 621-627.

Braunstein, C., Schlenker, R.: The Impact of Change in Medicare Payment for Acute Care, Geriatric Nursing 6:5 September/October 1985, p. 266-270.

Burns, Anne Kesselman, Assessing Technology Assessment, Business and Health 1:8 July/August 1984, p. 28-32.

Business Week: Health Plans May Leave Retirees Out in the Cold, December 17, 1984.

Butler, P.W., Bone, R.C., Field, T.: Technology under Medicare Diagnosis - Related Groups Prospective Payment: Implications for Medical Care. Chest 87:2 February 1985, p. 229-234.

Cafferata, G.L., Private Health Insurance Coverage of the Medicare Population. Data from the National Health Care Expenditures Survey. Review draft, April 16, 1984.

Champlin, L.: DRGs: Putting the Squeeze on Your Older Patients? Geriatrics 40:7 July 1985, pp. 77-81.

Changing Times: "Health Insurance: A Crucial New Choice for Older Workers," November 1983, p. 70.

Coleman, Barbara, A Consumer Guide to Hospice Care, National Consumers League: Washington, D.C., February 1985.

Coleman, Barbara, A Consumer Guide to Home Health Care, National Consumers League: Washington, D.C., June 1985.

Crocker, K.S., Nutrition Education in Schools of Nursing in the United States - Part 2. Submitted for Publication in Nursing Outlook - 1985.

Croen, Lila G., Hamerman, David and Goetzel, Ronnie Z., Interdisciplinary Training for Medical and Nursing Students: Learning to Collaborate in the Care of Geriatric Patients, Journal of the American Geriatrics Society p. 56-61.

Ebersole, P., Gerontological Nurse Practitioners Past and Present. Geriatric Nursing, July/August 1985.

Evashwick, D., Home Health Care: Current Trends and Future Opportunities, Journal of Ambulatory Care Management 8:4 November 1985, p. 4-17.

Douce, F.H., Coates, M.A., Attrition in Respiratory Therapy Education: Causes and Relationship to Admissions Criteria. Respiratory Care, 1984; 29:8; 823-828.

Fackelmann, K.: Top Firms Guarded Market Share in '84, Modern Healthcare 15:12 June 7, 1985, p. 160-161.

Fackelmann, K.: New HCFA Regulations Could Put Chill on Skilled Nursing, Home Healthcare, Modern Healthcare 15:7 March 29, 1985, p. 80-84.

Feinstein, P.H., Gornick, M.: The Need for New Approaches in Long-Term Care. In: Long Term Care Financing and Delivery Systems: Exploring Some Alternatives Conference Proceedings; 1984, Health Care Financing Administration, U.S. Govt. Printing Office, Washington, D.C.

Finkelstein, M.S., Problems of Managing Infections in Elderly Persons, Comprehensive Therapy 10:12 (December 1984) p. 32-39.

Fischer, D.A., Prentice, W.S.: Feasibility of Home Care for Certain Respiratory-Dependent Restrictive or Obstructive Lung Disease Patients, Chest 82:6, 1982.

Geriatric Nursing: Comment by a Community Nurse, 6:6 September/October 1985, p. 273.

Gilmartin, M., Home Care of the Ventilator-Dependent Person. Respiratory Care 28:11, 1983.

Gracey, D.R.: The Respiratory Therapy Practitioner, Respiratory Care: 27;8 1982.

Grau, L., Case Management and the Nurse, Geriatric Nursing, 1984: 5(8)

Grimaldi, P.: Looking Closely at Nutrition Support, Nursing Management 15:8 1984, p. 20-21.

HCFA. "Demographic Characteristics and Health Care Use and Expenditures by the Aged in the United States: 1977-1984," Health Care Financing Review, Fall 1984, 6(1), p. 1-29.

Hodgkin, J.E., Chairman, Ad Hoc Committee of the Scientific Assembly on Clinical Problems, Preliminary Rehabilitation and Continuing Care. Foreword - Pulmonary Rehabilitation: A Model of Team Care, Respiratory Care 28:11, 1983. Special Issue.

Marschke, S.: Rising Medical Costs Make Medigap Policies a Wise Investment, Senior World/San Diego, March 1982, p. B-10 - B-12.

Hughes, R.L.: Home is the Patient: A Word of Caution. Chest 86:344, 1984.

Jahnigen, D.W., Kramer, A.M., Robbins, L.J.: Academic Affiliation with a Nursing Home: Impact on Patient Outcome. J. Amer. Geriatr. Soc. 33:7, 1985.

Joint Review Committee for Respiratory Therapy Education. Enrollment Data 1979-1984. Tabulation received September 1985.

Joint Review Committee for Respiratory Therapy Education. Essentials and Guidelines of an Accredited Educational Program for the Respiratory Therapist, American Association for Respiratory Therapy, 1977.

Kane, R., Solomon, D., Beck, G. et al: The Future Need for Geriatric Manpower in the United States. NEJM 1980: 302(24),1327-1332.

Kuntz, E.F., For-profits Adding Home Healthcare to Aid Bottom Lines, Modern Healthcare 14:7, May 15, 1984, p. 168-170.

Ladefoged, K., Quality of Life in Patients on Permanent Home Parenteral Nutrition, JPEN, 1981, 5(2), 132-137.

Lowenthal, G., Breitenbucher, R., The Geriatric Nurse Practitioner's Value in a Nursing Home, Geriatrics, November 1975, pp. 87-91.

Luce, J.M.: Long-Term Oxygen Therapy: Physiologic and Economic Considerations, Respiratory Care 28:7, 1983.

Make, B., Gilmartin, M., Brody, J.S., Snider, G.L.: Rehabilitation of Ventilator-Dependent Subjects with Lung Diseases: The Concept and Initial Experience, Chest 86:3, 1984.

Malkus, B.L., Respiratory Care at Home. American Journal of Nursing, November, 1976, pp. 1789-1791.

Maples, L.: Patient-Family Responses to the DRG System, Geriatric Nursing 6:5, Sept/Oct 1985, p. 271-272.

McDonald, G.J.: Long Term Oxygen Therapy Delivery Systems. Respiratory Care 28:7. 1983.

Mechanic, D., Aiken, L.H.: A Cooperative Agenda for Medicine and Nursing, NEJM 307 (September 16, 1982) p. 747-750.

Meiners, M.R.: The State of the Art in Long Term Care Insurance, in Long Term Care Financing and Delivery Systems: Exploring Some Alternatives. Conference Proceedings. Washington, D.C. January 24, 1984. p. 15-29.

Meiners, M.R.: Shifting the Burden: The Potential Role of the Private Sector in Long Term Care Insurance for the Elderly, American Health Care Association Journal, March 1982.

Mercer Public Sector Report: Retiree Medical Costs. Emerging Crisis? 4:3 Summer 1984, p. 1-2.

Nathanson, M.: Payment Incentives Feed Controversy over Advantages of Nutritional Support. Modern Health Care 14:7, 1984.

National Center for Health Statistics: Health United States, 1984. DHHS Pub. No. (PHS) 85-1232. Public Health Service, Washington. U.S. Government Printing Office, December 1984.

O'Donnell, K., Church, L.: Home Care Can Aid Diversification, But Advance Planning a Necessity. Modern Health Care, 15:9, September 13, 1985, p. 154-156.

Peteet, J.R., Medeiros, C., Slavin, L., Welsh-Burke, K.: Psychological Aspects of Artificial Feeding in Cancer Patients, JPEN 1981, 5(2)138-140.

Petty, T.L.: There Is No Place Like Home. Respiratory Care 27:10. 1982.

Petty, T.L., Nett, L.M.: The History of Long-Term Oxygen Therapy. Respiratory Care 28:7, 1983.

Prewitt, M.W.: Role Expectations of the Respiratory Therapy Practitioner As Reported by the Role Incumbent and Other Health Care Professionals. Respiratory Care: 29:9. 1984.

Punch, L.: Chains Expand Their Operations, Expecting Prospective Pay Boon, Modern Healthcare, 14:7, May 15, 1984, p. 131-138.

Punch, L.: Investor-Owned Chains Lead Increase in Beds. Modern Healthcare 15:12, June 7, 1985. p. 126-136.

Punch, L.: Long Term Care Industry Develops Alternatives to Meet Needs of the Elderly. Modern Healthcare 15:9, April 26, 1985, p. 59-61.

Rabin, D.L.: Physician Care in Nursing Homes. Ann Intern Med 94:126, 1981.

Rao, D.B.: The Team Approach to Integrated Care of the Elderly, Geriatrics (February 1977) p. 88-96.

Reif, L.: The Critical Need for Nurses in Long-Term Care: Implications for Geriatrics Education. In: Aiken, L.H., ed. Nursing in the 1980s: Crises, Opportunities, Challenges. American Academy of Nursing, Philadelphia: J.B. Lippincott, 1982: 145-153.

Richman, D.: Most Chains Report More Patients, Profits, Modern Healthcare, 15:12 June 7, 1985, p. 158-159.

Robbins, A., Mather, J., Beck, J.: Status of Geriatric Medicine in the United States. J Amer Geriatr Soc 1982 30(3), 211-218.

Robbins, A.S., Vivell, S., Beck, J.C.: A Study of Geriatric Training Programs in the United States. J Med Educ 57; 79-86, February 1982.

Roselle, S., D'Amico, F.J.: The Effect of Home Respiratory Therapy on Hospital Readmission Rates of Patients with Chronic Obstructive Pulmonary Disease. Respiratory Care 27:10, 1982.

Ruhe, L.S.: Dialysis Centers Will Be Gobbled Up if They Can't Reduce Costs, Modern Healthcare, 14:7, May 15, 1984, p. 164-166.

Schroeder, Steven A.: Curbing the High Costs of Medical Advances, Business and Health 1:8, July/August 1984 p. 7-11.

Shields, E.M., Kick, E.: Nursing Care in Nursing Homes, In: Aiken, L.H., ed. Nursing in the 1980s; Crises, Opportunities, Challenges. American Academy of Nursing, Philadelphia: J.B. Lippincott, 1982: p. 195-210.

Somers, A.R.: And Who Shall Be the Gatekeeper? The Role of the Primary Physician in the Health Care Delivery System. Inquiry 1983, 20(4), 301-312.

Smits, H.L.: Manpower for Long-Term Care: Two Simple Suggestions. National Journal 13 (1981) 807-809.

Spearman, C.S.: The Respiratory Therapist's Role in Intensive Care Monitoring. Respiratory Care 30:7, 1985.

Steffee, W.P.: Nutrition Intervention in Hospitalized Geriatric Patients. Bull. N.Y. Acad. Med. 56:6, 1980.

Stein, J: Focus on the Strengths of an Aging Work Force, Says Butler, Business and Health 1:8 July/August 1984, p. 40-42.

Twomey, P.L., Patching, S.C.: Cost-Effectiveness of Nutritional Support. *JPEN* 1985 9(1), 3-10.

The Washington Post. Hospital Costs for the Elderly, editorial. *October 29, 1985, p.* A20.

The Washington Post. Needs of the Elderly Seen on the Increase, *October 29, 1985, p.* A19.

Weimer, M.P.: Home Respiratory Therapy for Patients with Chronic Obstructive Pulmonary Disease. *Respiratory Care* 28; 11. 1983.

Weinberg, S.L.: DRG Dilemmas in Intensive Care, *Chest* 87:2 February 1985, p. 141.

Williams, C.: Teaching Nursing Homes: Their Impact on Public Policy, Patient Care, and Medical Education. *J Am Geriatr S*, 1985: 33; 3,189-195.

Work in America: Improving Health-Care Management in the Workplace: A Work in America Institute Policy Study, New York: Pergamon Press, 1985.

Additions to II. Bibliography

American Medical Association, Directory of Residency Training Programs, 1985-1986. Chicago, Illinois, 1985.

Galambos, E.C.: Manpower and Education. Implications of Lengthened Health Education: Nursing and the Allied Health Fields. Southern Regional Education Board, Atlanta, Georgia, 1979.

Ginsburg, S.: An Exploratory Look at Clinical Education in Health Professions Education. Paper submitted to Health Resources and Services Administration, Office of Program Development, July 8, 1985.

Hopke, William E.: The Encyclopedia of Careers and Vocational Guidance: Vol. III, Selecting a Technician's Career, 1984. J.G. Ferguson Publishing Company, Chicago, Illinois.

Institute of Medicine: Nursing and Nursing Education: Public Policies and Private Actions. National Academy Press, Washington, D.C., 1983.

U.S. Department of Health and Human Services. Trends in Hospital Personnel, 1981-1983. Health Resources and Services Administration, ODAM Report No. 5-85.

American Hospital Association, Unpublished Statistics, 1985.

III. Nutrition Support and the Elderly

Introduction

Nutrition support broadly defined is both an old and a new technology. It is controversial in the sense that systematic assessment of the safety, efficacy, and cost effectiveness of different forms of the technology such as enteral and total parenteral nutrition for different clinical diagnoses has not been undertaken. As a technology, nutrition support is characterized by the issues of rapid growth, changes in sites of care, manpower and training requirements, and organization reimbursement policy/incentives and disincentives.

Nutrition support is not one technology. It ranges in complexity from special diets and oral nutritional substances to intravenous and tube feeding requiring a variety of devices and substances. Its administration can involve a range of health professional skills from physicians, pharmacists, nurses and dietitians to aides and lay family members. The services can be provided in homes, nursing homes and hospitals. Projections of manpower needs for this technology depend, of course, on numerous factors related to the efficacy of the technology, use rates, sites of care, payor coverage of the technology in different sites, reimbursement policies, and substitution of manpower who can deliver the technology.

The use of nutrition support services has grown rapidly during the past two decades despite continuing debate within the medical profession concerning its efficacy in many situations. Much of the growth is attributed to improved techniques and equipment which have reduced the incidence of complications, together with recognition of the extent of malnutrition among hospitalized patients. In a review of surveys of malnutrition among hospitalized patients, Mullen found estimates of between 30 and 50 percent. A 1976 survey showed 50 percent of surgical patients and 44 percent of general medical patients suffering protein-calorie malnutrition (Mullen, 1981). Malnutrition as a condition is not clearly defined, however, nor is any one definition accepted.

The elderly are more prone to degenerative diseases such as cardiovascular and malignant diseases requiring hospitalization and/or surgery than are younger populations. Recent studies show these types of diseases to be among the most prevalent underlying diseases of persons receiving nutritional support (Seltzer et al, 1984; Nehme, 1980; Dalton et al, 1984; McShane and Fox, 1985). As the size of the elderly population continues to increase, the incidence of such diseases can be expected to show an increase. Additionally, nutritionists estimate that malnutrition can be found in 5 to 10 percent of the homebound elderly (Champlin, 1985), making them likely candidates for nutritional support in the event of hospitalization. Since nutritionists have made these estimates, they may be overestimates.

Most of the studies of nutritional support in hospitals have investigated and reported the incidence of complications, or patterns of care, with no indication of the age distribution of the patient population. A 1979 study at Boston University Hospital showed a disproportionate number of patients over 60 receiving nutritional support. Although 30 percent of admissions fell into this age group, 50 percent of those receiving intensive nutritional support were over 60. The most common diagnosis in this study was cancer (Steffee, 1980). In fact, nutritional support services, particularly enteral and parenteral nutrition, were pioneered with cancer patients.

In a more recent study of 1,072 patients given parenteral and/or tube enteral nutrition during 1981 and 1982 at the Saint Barnabas Medical Center, Livingston, New Jersey, it was found that 65 percent were 60 years of age or older (Seltzer, 1984). This group represented 59 percent of patients receiving parenteral nutrition support and 71.5 percent of those receiving tube enteral feeding. Overall, 38 percent of the 1,072 patients studied died while in the hospital: 23 percent of those who died had received parenteral nutrition, and 44 percent had received tube enteral nutrition. The age distribution of patients who died is not given, but the diagnostic categories recording the highest proportion of deaths were cancer (43 percent), cerebrovascular accidents (51 percent), cardiac (69 percent) and respiratory diseases (60 percent), all of which are more prevalent among the elderly (Seltzer, 1984).

Nationwide estimates of the relative percentages of persons receiving parenteral and tube enteral nutrition support do not differ markedly from those found in the Seltzer study. A 1984 survey conducted by C.H. Kline & Company estimated that 6.2 million persons were receiving nutritional support, including oral enteral support. Of the 1.3 million receiving either parenteral or tube enteral nutrition, 556,400,or 41 percent, were receiving parenteral support, while 848,100, or 59 percent, were receiving tube enteral feedings. Ninety-six percent of parenteral support patients were in the hospital, almost 3 percent in nursing homes and almost 1 percent were at home. Similarly, 92 percent of patients receiving tube enteral nutrition were in the hospital, 6 percent in nursing homes, and almost 2 percent were at home (ASPEN, 1985). Comparing these figures to those reported for 1982, the number of persons receiving parenteral nutrition in hospitals has increased from 200,000, or about 168 percent, in two years. The number receiving either oral or tube enteral support increased during the same period from 2 million, or 173 percent (Grimaldi, 1984). No similar comparative data are available for nursing homes. In 1982, however, it was estimated that 2,712 patients were receiving total parenteral nutrition in the home (Kuntz, 1984) compared to 4,600 in the Kline study. This indicates a growth of 70 percent in one year. Clearly, utilization of nutritional support has been increasing rapidly in the past few years, and available data suggest that much of it is directed towards the elderly population.

Technology Assessment

Nutritional Assessment

Any discussion of the assessment of the technology of nutritional support must also examine the associated technology of nutritional assessment. There is still debate as to which variables need to be measured to determine nutritional status, the extent of testing necessary to determine nutritional deficiencies, and the applicability of available norms to the elderly. This latter factor is of particular importance.

The purpose of nutritional assessment is to determine the nutritional requirements of the patient, not merely to determine current nutritional status. In addition to basal metabolic rate and other measures of energy expenditure, the degree and rate of weight loss must also be ascertained during the initial evaluation since weight losses of 10 percent or more of body mass may also be indicative of caloric or nutrient deficiencies in the diet, and can affect treatment outcomes (MacBurney and Wilmore, 1981).

Based on the results of the nutritional assessment, the physician decides on the need for nutritional support, the modality to be used and the nutrient mix to be administered, in consultation with others on the health team. However, the standards used in making these determinations are not necessarily applicable to the elderly patient, possibly resulting in the use of unnecessary, expensive therapy.

Seltzer et al noted the significance of the high proportion of elderly receiving nutritional support in light of "the ambiguity of nutritional assessment parameters and nutrient requirements in the geriatric patient" (Seltzer et al, 1984). Steffee notes the difficulty in separating out the natural loss of lean body mass associated with aging from that of weight loss associated with the "effects of malnutrition whether secondary to the anorexia of disease or the effects of therapy" (Steffee, 1980). The use of standards developed for children and young adults to assess the nutritional status and requirements of the elderly patient clearly warrants examination, if optimal outcomes are sought for the elderly patient, and inappropriate use of nutritional therapy is to be avoided.

Assessment of Efficacy

Nutritional support may be prescribed for patients for a number of reasons. It is a primary therapy for patients with severe, non-malignant intestinal disease or short bowel syndrome, permitting the "repair, restoration, and adaptation of the intestinal tract while supporting the normal growth and metabolism of the patient" (MacBurney and Wilmore, 1981). In other cases, it is adjunctive, serving to "maintain or restore normal nutrition and metabolism so that medical and surgical treatments can continue without the complications that may result from malnutrition" (MacBurney and Wilmore, 1981).

No large prospective, randomized clinical trials to assess the efficacy of parenteral and enteral nutrition had been conducted as of July 1985 (Koretz, 1985). Such studies "are difficult to conduct because of the heterogeneity of the clinical population, multiple disease and treatment variables, and strong impression among clinicians that nutritional support is a valuable form of treatment." The last factor limits the number of patients available for randomized, prospective clinical studies (Mullen, 1981). A 1981 study conducted at the Hospital of the University of Pennsylvania showed that pre-operative nutritional support of at least 7 days reduced the rate of complications and mortality in a group of patients identified as "high risk" according to a prognostic nutritional index. The index had been developed and previously used to predict degree of risk of complications in another group of patients who had received post-operative nutritional support (Mullen, 1981).

Other studies of intravenous feeding of surgical patients have not shown significant differences in patient outcome between those who received nutritional support and those who did not. However, post-operative feeding is advocated to prevent loss of weight and nutritional depletion due to the effects of injury or infection (MacBurney and Wilmore, 1981).

Nutrition support in cancer patients was first recommended by Dudrick as a way to restore body weight, thereby enhancing the patient's sense of well-being, and possibly increase tolerance to chemotherapy, decrease the toxic effects of chemotherapy, and increase tolerance to higher doses of the chemotherapeutic agent (Elliott, 1980). However, the conclusions reached from a set of 11 papers presented during a National Cancer Institute symposium in 1980 were that TPN would do little to improve the nutritional status of cancer patients who had lost weight because of the nature of their disease. In addition, the studies did not support the suggestion that patients receiving TPN responded more positively to chemotherapy. Investigators also reported a high level of complications from the use of TPN. The studies presented were criticized by others in the medical community who pointed out that they were based on small numbers of patients, were conducted by physicians and other personnel not well-versed in the techniques of parenteral nutrition (thus accounting for the large number of complications reported), and the studies compared multiple types of cancers at different institutions. A spokesman for the Diet, Nutrition and Cancer Program which organized the symposium indicated that these studies represented preliminary investigations in the evaluation process of the role of TPN in the treatment of cancer. It was expected, he added, that future research would show that the use of TPN could be effective in improving the nutritional status of some cancer patients (Elliott, 1980).

Detractors of the results of the studies presented at the symposium indicated that their own research on larger patient populations supported several of Dudrick's original claims (Elliott, 1980). Even with the controversy over the role of nutritional support in the treatment of the cancer patient, cancer continues to be among the leading diagnoses for patients receiving nutritional support in studies reported in the literature.

Cost-Effectiveness

The studies discussed represent a risk-benefit approach to technology assessment. The investigators have sought to measure the reduction in morbidity and mortality in patient outcomes attributable to the use of the technology, implicitly or explicitly weighing such benefits against the attendant risk of morbidity or mortality inherent in the use of the technology itself.

Another important aspect of assessment is the determination of the cost-effectiveness of the technology, i.e., what are the dollar costs of using the technology, including costs associated with morbidity and mortality arising from the technology, versus the value of benefits derived from use of the technology.

Twomey has recently conducted such an analysis for the two nutritional support modalities of parenteral and enteral nutrition. Drawing data from many different sources to estimate costs, and using the findings from two large clinical studies conducted in West Germany and Wales, Twomey estimated that the use of TPN for pre-operative surgical patients could result in savings of $1,720 per patient. Twomey cautions against using his data to support decisionmaking with respect to the advisability of use of TPN in specific cases. The author notes that a "lack of controlled trials of adequate size to rule in or out clinically important benefits from special support, especially TPN" is a major roadblock to producing reliable estimates of the cost-effectiveness of nutrition support (Twomey, 1985)

Manpower and Training Issues

Provision of nutrition support typically requires the cooperation and expertise of four health professions - medicine, nursing, dietetics, and pharmacy. The physician prescribes the particular regimen to be followed; the dietitian works out the appropriate solution mix to meet the assessed nutritional needs of the patient; the pharmacist mixes the solutions, or selects the appropriate pre-mixed solutions; and the nurse, either an RN or LPN, administers the solution via the selected modality. The success of enteral or parenteral nutrition is dependent on such variables as accurate initial assessment of the patient's nutritional status and needs; the technical expertise of the personnel delivering the care, especially inserting the catheter or feeding tube, and timely recognition and treatment of complications relating to the therapy.

It is not at all clear from a review of the training received by individuals in each of the four health professions, particularly at the undergraduate level, that the highest standards of training and knowledge are available to all patients receiving nutritional support, nor that there is agreement on manpower or training needs. The following sections review the extent of formal or informal nutrition education generally found for personnel in each of the four health professions most closely involved in the provision of nutritional support services, and the usual patterns of care found in the hospital, the nursing home, and the home.

Medicine

The paucity of curriculum content relating to nutrition in the undergraduate medical schools has been of concern to many health professionals, the American Medical Association and the Federal Government for several decades. Reports of meetings and conferences held during the 1960s and 1970s "document the astonishing lack of adequate nutrition instruction in health professions schools" (Nestle, 1982). Only about 20 percent of the medical schools in 1962 had required nutrition courses (Long, 1982). By the late seventies, this percentage had risen to 27 percent and continued to rise to

37 percent by 1981-82. By 1983-84, however, only 27 percent of the 127 medical schools had required nutrition courses in their curricula. Sixty-six percent of the schools in 1983-84 stated that nutrition was incorporated into other courses, and 64 percent had nutrition courses that could be taken as electives (National Academy of Sciences, 1985).

A review of 192 nutrition-related questions in Parts I and II of the National Board Examinations offered in 1980, 1982, and 1984 failed to identify any test questions on subjects of nutrition and the aged, nutrition and cancer, osteoporosis, or parenteral and enteral nutrition (National Academy of Sciences, 1985).

Several reasons are given for the lack of progress in providing effective nutritional education in medical schools. First, nutrition is a subject that spans several different fields, both within the basic sciences and the clinical sciences. Finding the appropriate place within the undergraduate curriculum to integrate such courses is difficult. While first-year students could certainly grasp the basic science content, introducing the clinical aspects at this point would be premature. On the other hand, third- and fourth-year students are usually on clinical rotations of 4 to 6 weeks, which would entail offering any new course year-round to ensure its availability to all students (Long, 1982).

Second, there is a shortage of faculty with the appropriate background for teaching nutrition. The NAS study found that "successful organization of nutrition teaching in medical schools depends on the leadership of faculty who are committed to nutrition education." In 12 schools surveyed, MDs and PhDs from a variety of clinical and basic sciences shared this responsibility about equally, and the faculty members interviewed felt it was important to have an MD involved to serve as a role model and emphasize the importance of nutrition education (National Academy of Sciences, 1985).

Among other reasons given for difficulty in developing nutrition programs is the lack of financial support from schools for such programs, the part-time nature of the teaching by the faculty who have patient care responsibilities in addition to the teaching load, and the difficulties inherent in attempting to coordinate multidisciplinary teaching with other health professions schools' schedules (Nestle, 1982). These are the same reasons given for absence of other inter-or multidisciplinary courses, such as health economics, bioethics, etc.

With so much evidence as to the lack of nutrition education received by the physician at the undergraduate level, it could be assumed such training is incorporated into residency programs. No national survey of residency programs has been identified to date that analyzes the extent of such training, particularly that which deals directly with the aging, the cancer patient, the surgical patient and others who may have need of enteral or parenteral nutritional support. In fact, there appears to be little effort to provide this training in graduate medical education programs. This may or may not be surprising given the fact that "any physician so desirous can declare himself suitable to oversee a very delicate and costly medical situation," (Seltzer, 1984) that of nutrition support. While it is clear that some nutrition teaching in medical schools does take place during postgraduate training, the effectiveness of such teaching will vary according to the commitment of the training program director at the medical school or hospital who oversees the postgraduate training, and the motivation and interest of the resident (Long, 1982).

Increasing the nutrition content of the undergraduate medical curriculum is considered to be the best way to ensure a lasting impact of the importance of nutrition in clinical practice (Long, 1982).

Pharmacists

Nutrition is integrated throughout the pharmacy curriculum although it would be unusual to find separate required courses in the first-degree program. Although early pharmacy education in nutrition was related to the importance of vitamins in the diet, current interest focuses on the effects of malnutrition on drug therapy. It is known, for example, that malnutrition can affect the absorption of drugs and thereby, the effectiveness of drug therapy. Additionally, pharmacists are concerned with the unintended side effects of drugs due to malnutrition (personal communication, AACP).

No surveys have been found that examine the role of nutrition education in pharmacy; however, the American Association of Colleges of Pharmacy (AACP) has recently published a new curriculum guide that emphasizes education in pharmaceutical services directed to the geriatric patient. One area specifically noted in the new guide is nutrition (personal communication, AACP).

First-degree pharmacy students are introduced to the concepts of parenteral and enteral nutrition in courses related to the selection and mixing of nutrient solutions. After receiving the pharmacy degree, pharmacists may enter residencies in hospital pharmacy or nutrition that extend their knowledge in this area. Many hospital pharmacists, however, acquire their specialized knowledge of parenteral and enteral nutrition through in-service training or through participation in postgraduate courses and seminars offered through universities or through organizations such as the Association for Parenteral and Enteral Nutrition (ASPEN), (personal communication, Association of Hospital Pharmacists).

Dietitians

There are two educational paths to training as a Registered Dietitian and for membership in the American Dietetic Association. The first comprises academic course work, with hospital/clinical/community experience interspersed throughout four years. There were 67 such programs in 1984. In the second type of program, the student first obtains a baccalaureate degree in either nutrition, food systems management, or dietetics and then follows one of several routes to obtain the required clinical experience, including internship. Most basic educational programs in dietetics include courses providing information specifically related to the nutritional needs of the elderly (Sims et al, 1984).

However, it is only recently that researchers in nutrition have recognized that findings applicable to young adults were not necessarily applicable to those 65 or older. This research has found that the nutrient requirements of the elderly are different from those of the younger person; that some of the effects of aging, for example on the immune system, mimic the effects of protein-calorie malnutrition (Steinbaugh, 1984).

In view of such findings, the profession of dietetics has been reviewing its curriculum with respect to aging to ascertain how best to communicate and incorporate ongoing research on the nutritional effects of aging into its programs.

~~Nursing~~ Nurses

Since the time of Florence Nightingale, the nursing profession has recognized the importance of nutrition in the care of the ill. Originally, nurses were trained to prepare and serve special meals for the sick. As the profession of dietetics developed, however, many of the meal preparation duties of the nurse were taken over by dietitians, and the focus of nutrition training for nurses turned to the theory and principles of nutrition and diet therapy (Crocker, 1985).

During the decades of the 1950s and 1960s, major changes were introduced in the way nutrition was taught. The concept of an integrated curriculum was introduced, threading nutritional knowledge throughout the training program. Dietitians were often recruited as part-time faculty members to teach nutrition content. During these years, dietitians and nurses recognized that their roles with respect to patient education in dietary matters overlapped, often because the nurse typically spent far more time with the patient. The organization, Nutritionists in Nursing Education (NINE), a clinical practice group within the American Dietetic Association, was formed in 1972 to seek ways to improve inter-professional relationships and to improve nutrition education in nursing schools (Crocker, 1985).

A 1983 survey of baccalaureate nursing schools in the United States found that nutrition was integrated throughout the four year curriculum. About half of the 246 respondent programs had required nutrition courses, averaging about 32 hours of instruction over the four years of training. The programs emphasized nutritional assessment, treatment, and evaluation of therapy. Graduate programs appeared to have lesser commitment to nutrition education, although the author notes that this may be due to a definitional problem associated with the wording of the relevant questions. Although about half of the programs had access to the services of a nutritional support nurse, few took advantage of the opportunity to use her as a preceptor in their teaching programs (Crocker, 1985).

The certification of subspecialists within all health professions has been a growing trend for several decades. The Association for Parenteral and Enteral Nutrition (ASPEN) has developed a certification program for nurses in parenteral and enteral nutrition (PEN). The first examination was given in June 1985. A certification program for dietitians has also been developed, and negotiations are currently in progress with the Boards of Pharmacy to develop a certification program for pharmacists in PEN.

Nutrition Support - Hospital Practice

Advocates of nutritional support believe the most successful patient outcomes will be achieved when the nutrition needs of the patient are totally managed by a team of health professionals including a physician, a pharmacist, a dietitian, and a nurse.

A 1983 survey of 1495 hospitals considered likely to have nutritional support teams (i.e. those with at least three dietitians, four pharmacists, and offering parenteral nutrition including admixture services) revealed that in fact only 521 actually had a nutritional support team (NST). (McShane and Fox, 1985). Although the provision of nutritional support does not require a formal team organization, there is evidence that the availability of a NST can lead to fewer complications, and a more satisfactory outcome.

Nehme, in 1980, reported on a two-year prospective study conducted in 1977-78 at a large city-county hospital. The study compared the complication rates of two groups of patients - one group that received its total TPN care from members of the NST (Group A) and another within the same hospital whose care was managed by the patients' respective physicians. In addition to the regular members of the NST, surgical housestaff rotated on the team for a month as part of their training.

Patients in Group A received a complete nutritional assessment. TPN was only instituted for patients whose gastrointestinal tract was nonfunctional or who required a large calorie-protein supply. Strict standard techniques were followed for administration of TPN, and all catheters were inserted by NST physicians, again following strict guidelines to maintain sterility during the procedures. All the guidelines followed by the NST were available to other physicians within the hospital.

Patients not treated by the NST did not receive a complete nutritional assessment, and the decision to administer TPN was based on very general factors relating to the patient's general condition, ability to eat and body weight. Catheters were placed by various physicians with varying degrees of skill, who did not adhere to any one set of guidelines. Where a chest roentgenogram was obtained for all Group A patients within one hour of catheter placement, in 11 Group B patients there was no evidence of such a procedure having occurred, and in the remainder chest roentgenograms were obtained from one hour to three days after catheter placement. Care of dressings for Group A patients followed a very strict protocol, care for Group B patients followed the general IV therapy guidelines of the hospital, or depended on the instructions of the individual physicians or staff nurses.

Comparisons between the groups of incidence of catheter insertion complications showed an overall 3.7 percent rate for Group A versus a 33.5 percent rate for Group B. Similar differences were found in the rates of catheter sepsis, thrombosis, and metabolic complications. The authors attribute the differences to "poor technique" on the part of non-team physicians in inserting catheters, and the lack of strict protocol for care and monitoring patients for complications (Nehme, 1980).

Other studies have reported a reduction in catheter-related sepsis through adherence to strict infection control protocols. In response to these findings, many institutions have developed multi-disciplinary TPN teams to take primary responsibility for administration of TPN therapy (Dalton et al, 1984).

The development of consultative TPN teams has been an alternative approach to the team concept in management of TPN patients which allows the utilization of existing manpower and financial resources. In 1979, the Ann Arbor Veterans Administration Medical Center established a consultative TPN team which included a physician, several pharmacists, a nurse and a dietitian. In a two-part prospective study they compared the rate of complications among three groups of patients -- those whose primary physician provided the care, utilizing the TPN team on a consultant basis only; those whose primary physician worked closely with the TPN team in a joint capacity; and patients at another institution where the TPN team took total responsibility for management of the patients' care. The study showed that increased involvement of the consultative TPN team significantly improved several aspects of TPN care, especially patient monitoring. However, the rate of complications was still considered to be excessive when compared to patients whose care was totally managed by a TPN team at another institution (Dalton et al).

The findings from these two studies indicate inadequate training of the primary physicians in the necessary procedures of catheter insertion and follow-up care. The 1983 survey of hospitals with nutritional support teams indicates that a minimum of 900 hospitals offering parenteral nutrition services do not have nutritional support teams as such. This poses the question of the quality of such care being offered to patients in those hospitals, and others with smaller numbers of health professionals that would not have been included in the Directory of Nutrition Support Teams.

Patterns of Nutritional Support Team Care

Of the 246 respondents to the 1983 survey (McShane and Fox, 1985), 51.4 percent were nutritional support teams in 200 to 500-bed private, non-profit hospitals. Another 35 percent were in 500 to 1,000-bed hospitals. Ninety-five percent of the teams were established after 1975, and 60 percent were set up after 1980, documenting the increased interest in clinical nutrition during the period. Respondents noted that increased awareness of hospital malnutrition was a motivating factor in the establishment of the teams.

The team physician was reported as the team leader by 61 percent of the NSTs. Team physicians were most likely to be surgeons, followed by gastroenterologists. Thirteen percent of respondents classified team physicians as specialists in clinical nutrition.

Over 90 percent of the respondents indicated that their teams included at least one member from each of the professions of dietetics, pharmacy, nursing and medicine. Other members of the teams included medical, surgical, and pharmacy residents and fellows, home care directors, physicians' assistants, Ph.D. nutritionists, clinical RN specialists, and LPNs.

The review of educational backgrounds of the team members provides insight into the source of training of health professionals in this field. Fifty-two percent of the nurse team members held B.S. degrees, of which 75 percent were in nursing. Seventeen percent held master's degrees of which 7 percent were in nutrition. A hospital medical/surgical background was noted for 71 percent of the nurses, although many indicated previous experience on such specialty teams as intensive care, infection control or IV therapy.

Almost all team dietitians were Registered Dietitians. In 66 percent of cases, team dietitians held a baccalaureate degree, followed by a general clinical internship; 35 percent of team dietitians held an M.S. degree, the majority in nutrition. The majority of dietitians had begun NST following general clinical practice.

Among team pharmacists, 41.5 percent had a graduate degree. Subject majors mentioned included hospital pharmacy, nutrition support and business. Only 4.5 percent of pharmacists indicated training in a pharmacy residency specific to nutrition (McShane and Fox, 1985).

About 39 percent of the NST reported supervising home TPN/EN. The majority of respondents - 61 percent - reported a negative attitude towards the team from attending physicians, either because they were not convinced of the team's value, or because they felt the team was duplicating services they already provided.

One finding from this study, noted by the authors as an indication of genuine teamwork, but perhaps of more importance because of the patterns of care in nursing homes and the home, is the fact that some non-physician members of the NST had limited authority to write orders. (McShane and Fox, 1985)

An earlier study describes a situation where a pharmacist acted as team leader in a 635-bed private, nonteaching hospital. The pharmacist in this case, in response to a request from the attending physician, reviewed the patient's chart, conducted a physical assessment, and ordered lab tests. According to the results of these procedures the pharmacist wrote the assessment on the patient's chart, together with the goals for therapy. He then wrote all TPN orders, which were co-signed by the physician within 24 hours. The pharmacist conducted rounds with other TPN members who included a staff pharmacist, a pharmacy resident, IV therapy nurse, floor nurse and therapeutic dietitian. The authors of this study note that the typical physician member of the hospital staff was one who had been in practice for more than 20 years, and who was unlikely to have received any formal training in TPN. With the introduction of this new clinical service, physicians who may have been reluctant to use TPN in the past because of their lack of knowledge had come to rely on the pharmacist for his expertise in this area. The number of patients receiving TPN therapy at the hospital increased from 6 in 1976 to 54 in 1978 (Greenlaw, 1979).

The foregoing studies suggest that:

- The presence of a nutritional support team in a hospital can reduce the number of complications associated with TPN, especially if the team is given total patient management responsibility;
- In the absence of a NST, adherence to strict protocols in all areas of TPN can significantly reduce associated complications;
- Many physicians do not have adequate training in the techniques and procedures necessary to ensure optimum outcomes with TPN therapy;
- Many physicians may be reluctant to institute TPN because of their own lack of knowledge, or because of their lack of conviction of the efficacy of the treatment.
- The existence of an NST can generate new demand for the service.

Nutrition Support in the Home

Most of the literature concerning home nutrition support relates to parenteral nutrition, and this emphasis is reflected in the following discussion.

In 1970, Scribner et al described the use of an "artificial gut" system to provide "long-term total parenteral nutrition...in patients unable to take enteric nourishment." During the following ten years, the new system suffered some setbacks, but eventually many of the technical problems, especially those associated with catheter insertion, were overcome, and a portable infusion system was devised which greatly enhanced patient mobility, and therefore, quality of life (Scribner and Cole, 1979).

Central to the success of these discoveries was the ability of the patient to participate in his or her own care. Most patients on HPN either prepare the solutions themselves, or obtain pre-mixed solutions through a pharmacy. A 1980 survey of 51 hospitals with HPN programs showed that in 25 percent of programs the solution was prepared at home by the patient or family member, and in 57 percent of cases, the hospital pharmacy provided the parenteral solutions. A few programs had both types of patients in their programs. The majority of programs were located in large (greater than 400 beds) university-affiliated, teaching hospitals, and had been in existence an average of three years. Although 34 of the hospitals had two or fewer HPN patients, the remaining 17 hospitals accounted for about 150 patients or an average of about 9 patients each. Patient education and training were conducted most often by the pharmacist, the TPN nurse, and the physician. For the most part the teaching was informal and included such educational aids as patient instruction manuals, slides, and other audio-visual materials. Patient monitoring was usually conducted on an outpatient basis by the physician (usually a surgeon), the pharmacist and other members of a nutritional support team (Karnack et al, 1981).

Other descriptions in the literature of individual HPN programs confirm this pattern of patient education and monitoring (Grundfest, 1980: Ivey et al, 1985). In some programs, dietitians play a greater role in the training of the patient (Bloch, 1977).

In recent years, home care agencies have been moving into the field of home parenteral nutrition. This trend has provoked concern within the medical community relating to the quality of care that will be provided. When nutritional support is provided through a home health agency, agency employees, such as clinical nurse specialists, are responsible for monitoring patients and responding to clinical emergencies. There is concern regarding the possible lack of physician supervision of the patient care rendered, or inaccessibility of the physician in the case of an emergency requiring immediate attention. In the latter situation, the concern is that the home care nurse might be required or tempted to make clinical judgments for which, in the opinion of some physicians, she is not trained. This could prove to be a particular problem where patients are located away from urban centers (Copeland, 1985).

Other concerns relate to the motivations of the home care industry, and its need to balance the provision of quality patient care against its desire to make a profit. One example is cited of patients being accepted for care even though they had received no training in use of the infusion pump or in catheter care, and of other patients who almost failed to receive their solutions because of company financial problems (Rosenkranz, 1985).

High technology home therapy, including parenteral nutrition, is one of the fastest growing segments of the industry. However, many organizations are seeking to collaborate with hospitals in developing such programs because of the relatively small number of patients, the complexity of the programs, and uncertainties related to reimbursement. This trend may help to alleviate the fears of increased complications and lack of supervision by the requisite health personnel.

Nursing Homes

According to the C.H. Kline and Company survey, there were 69,000 people receiving either parenteral or enteral nutrition support in nursing homes in 1984. Of these, 15,600 or 22.6 percent were receiving parenteral support, a much larger percentage than had been previously believed to be the case (ASPEN, 1985). In the nursing home, most of the daily care is given by either a Licensed Practical Nurse (LPN) or a nursing assistant, under the supervision of a Registered Nurse (RN). The RN is charged with the responsibility of instructing the LPN in the procedures for providing parenteral and enteral nutrition. The RN has the responsibility to "hang the prescribed parenteral nutrition support, to make clinical adjustments in the rate of flow, and to verify and make clinical judgments based upon reported observations of the patient" (Kittelberger et al, 1984). The RN may delegate to the LPN responsibility for monitoring delivery of the solution to the patient, and for checking the infusion site and adjacent areas. With enteral nutrition, the RN inserts the nasogastric tube, but may "delegate the actual administration of the feeding to the LPN." The nursing assistant may not take part in the actual feeding procedures. The RN is expected to make "clinical judgments and decisions" based on the observations of the LPN or the nursing assistant.

It is not clear who performs the initial nutritional assessment in the nursing home. It is suggested that this be performed by the in-house dietitian (Kittelberger et al, 1984). However, many nursing homes do not employ their own dietitians, utilizing their services on a consultative basis only. In such cases, the nutritional assessment "may become the responsibility of other trained health care professionals" (Kittelberger et al, 1984), presumably the RN, in the absence of a staff physician.

The number of people receiving parenteral and enteral nutrition in nursing homes is expected to continue to increase as hospitals begin to respond to the full impact of prospective payment reimbursement. As a result, several large nursing home chains are developing "sub-acute" care beds to provide services for patients who require a higher intensity of nursing care than is now generally available. In anticipation of increased demand for such beds, larger nursing staffs are being hired, and the level of training of current personnel is being upgraded to provide the necessary level of care (Punch, 1984).

On the other side of the coin, hospitals are beginning to designate some of their beds as "subacute" care beds to provide this level of care to patients not requiring full, inpatient levels of care. Additionally, hospitals are contracting with nursing homes to hold places for their patients to ensure they can be discharged to the less expensive mode of care at the appropriate time, thus shortening length of stay in the hospital while preserving a higher level of care than discharge to home might bring (Braunstein, 1985).

Based on available research and literature, it would appear that as the setting shifts from the hospital to other sites, the level of involvement of the four relevant health professions changes. In the hospital, the professions work as a team--even where not formally organized as such--each sharing the responsibility for care of the patient. In the home, the patient or near relative takes most of the daily responsibility for care, monitored by the visiting nurse and distantly supervised by a physician. After the patient is discharged from the hospital, the dietitian virtually drops out of the picture, and the pharmacist becomes mostly a supplier of nutrient solutions. In the nursing home, based on studies of nursing home staffing patterns, the most likely provider of daily care is the LPN, supervised by an RN, who appears to have broad latitude in making clinical decisions.

Reimbursement Changes-Impact on Delivery of Nutrition Support

As noted in Section II of this report, reimbursement changes strongly influence the use and sites of health care services. Changes in Medicare, which covers most of the over-65 population and which pays for over one-third of all hospital care in the nation, strongly influence the policies of other third-party payers, and have the power to affect the use of technologies not only for the elderly but for all hospitalized patients (Burns, 1984).

Prior to the implementation of the prospective payment system based on diagnosis-related groups, nutritional support was included in hospital charges, much as housekeeping and dietary services are, and all costs were reimbursed on a retrospective cost basis. It has been observed that this situation may have led to inappropriate use of the technology, especially in the case of the "truly aged and infirm" who have little prospect for recovery, marginal quality of life, and for whom the instituting of nutritional support represents mostly a prolonging of the act of dying (Kaminski, 1984).

With the changeover to DRG reimbursement, hospitals are exploring ways in which to trim lengths of stay in order to stay within the reimbursement parameters for each of the DRGs. Nutritional support is already included within DRGs for specific diagnoses; only in a very few cases, where malnutrition is the primary diagnosis, is it reimbursed separately.

Proponents of nutritional support believe that it can reduce lengths of stay by reducing the number of complications of treatment to which the malnourished patient is particularly prone, thereby reducing days of hospitalization and additional costs to treat the complications. It is estimated that in the United States, infectious complications cost about $2,000 per incident, whereas major complications may reach as high as $50,000 (Nathanson, 1984).

Opponents point out that the use of parenteral nutrition itself causes complications in 5 to 10 percent of patients who receive it, and that the majority of prospective studies that have been undertaken do not show any evidence to support the thesis that parenteral nutrition lowers length of stay, morbidity, or mortality (Nathanson, 1984).

There is concern that hospitals will begin to "scrutinize the very sick patients who are being kept alive by parenteral nutrition. Hospitals could reduce length of stay by removing the tubes and letting the patients die" (Nathanson, 1984), although potential litigation may act as a barrier to this actually occurring.

Advocates of the nutritional support team concept state that such a team reduces hospital costs for nutritional therapy by preventing many of the complications resulting from parenteral nutrition, and by monitoring the patient's nutritional support requirements closely to ensure that he or she is moved to less costly enteral therapy, if possible, or arranging for home care where feasible (Nathanson, 1984).

The literature indicates that hospitals are reacting to DRG reimbursement by sending patients home earlier, sometimes in "weaker and more serious conditions" (Krup, 1985: Fackelmann, 1985: Punch, 1984). This appears to be borne out by the dramatic growth in the number of patients in nursing homes and at home who are receiving parenteral nutrition support. However, once the patient leaves the hospital, reimbursement policies change, and it is these changes that affect the types of health personnel who will be involved in the non-hospital patient care.

In the hospital, pharmacist and dietitian services are included in the hospital charges to the patient, which facilitates the inclusion of such health personnel on the nutritional support team. In the home, Medicare only reimburses for skilled nursing services provided either by an RN or an LPN, and on a fee-for-service basis for the physician. Although some home care agencies may employ a dietitian and absorb the costs themselves, this does not appear to be an industry-wide policy (American Dietetic Association, 1985). There is no reimbursement for the services of a pharmacist, or even for the costly nutrient solutions. Thus, the lack of reimbursement for dietiticians and pharmacists is of concern to advocates of the team approach to nutritional therapy, who consider that all four health professions need to be involved to ensure proper monitoring of care, and prevention of complications. The lack of reimbursement for the nutrient solutions is an additional disincentive.

In the nursing home, the level of Medicare reimbursement serves as a disincentive to provide high-technology services. As hospitals feel pressure to discharge patients to non-acute care settings and transfer patients requiring nutritional support to skilled nursing facilities (SNF), the probability increases that patients will not meet the criteria for Medicare payment and will spend down into Medicaid eligibility. Often Medicaid payment is too low to cover the care of patients requiring support technologies such as TPN (Champlin, 1985). In addition, many nursing homes do not have adequate staffing or equipment to care for "subacute" patients, although at least one nursing home care organization is reported to be increasing the size of its staff and upgrading the level of training to meet the expected increase in demand for high-technology services (Punch, 1984).

Clearly, as reimbursement changes put pressure on the hospitals to move patients out of the hospital to nursing homes or discharge them to home, the brunt of the responsibility for provision of high-technology care in these settings is placed on the shoulders of the nursing profession. While some observers view this trend with concern, others believe that the time has come for physicians to recognize this de facto expansion of responsibilities of the nursing profession, and to "strengthen the role of nurses as primary providers, with physicians in consultative roles" (Mechanic, 1984).

Conclusion

The impact of changes in the way hospitals are reimbursed on the provision of nutritional support services is documented in Section II of this report. Of primary importance is the movement of patients from the relatively high intensity of care in the hospital to nursing homes or to their homes.

Nutritional support, whether expensive parenteral therapy or the relatively less expensive tube enteral therapy, carries with it the risk of major complications requiring timely recognition and treatment. The benefits of the therapy are not clearly documented, and are still subject to considerable debate within the medical community.

Assessment of candidates for nutritional support is also subject to controversy, particularly since current standards against which to measure nutritional status are not necessarily applicable to the elderly population to whom much of nutritional therapy is directed.

Since nutritional therapy is initially prescribed by the physician, it is imperative that more attention be given to assure that the education and training of the physician allows him/her to make an informed judgment as to the need for and the efficacy of nutritional support. As more patients are moved out of the hospital, and receive much of their daily care away from the immediate supervision of a physician medical staff, it may be that the scope of practice and responsibility for clinical decisions by the nurse should be reviewed and perhaps expanded to permit the making of such decisions. Concomitant education and continuing education might be required. The current role of LPNs and aides also raises concern as to their training and ability to recognize complications and seek appropriate assistance.

III. Bibliography

American Dietetic Association, Nutrition Support Services in Home Health Care, Legislative and Public Policy Statement, March 1985.

ASPEN, Standards of Practice - Nutrition Support Nursing, January 1985.

ASPEN, "1984 Nutritional Support Population Exceeds 6 Million", Update 8(4), September 1985.

ASPEN, "1985 Mid-Year President's Report," Update 8(3), July 1985.

Bayer, R.: Prometheus Meets Malthus. Business and Health 1(8), 1984, 22-25.

Bloch, A.S.: Dietitians Play a Role in the Home Training of Patients. Journal of Parenteral and Enteral Nutrition 1(3), 1977, 160-162.

Braunstein, C., Schlenker, R.: The Impact of Change in Medicare Payment for Acute Care. Geriatric Nursing 6(5), 1985, 266-270.

Burns, A.K.: Assessing Technology Assessment. Business and Health 1(8), July/August 1984, 28-32.

Champlin, L.: Geriatric Care: Can the Physician do it Alone? Geriatrics 40(1), January 1985, 125-134.

Cohen, J.D., Hunsley, J., Wattler, A., et al: Evaluation of Nutrition Education Program for Medical Students. Journal of Medical Education 56(9), September 1181, 773-775.

Copeland, E.M.: The Implications of Industry Moving into the Field of Home Parenteral Nutrition. Journal of Parenteral and Enteral Nutrition 9(1), 1985, 1-2.

Copeland, E.M.: Reply to Letter by Crocker et al. Letter to the Editor. Journal of Parenteral and Enteral Nutrition 9(5), 1985, 635-636.

Crocker, K.S.: Implications of Industry Moving into the Field of Home Parenteral Nutrition. Letter to the Editor. Journal of Parenteral and Enteral Nutrition 9(5), 1985, 633-635.

Crocker, K.S.: Nutrition Education in Schools of Nursing, Parts 1 and 2. Submitted for publication in Nursing Outlook, 1985.

Dalton, M., Schepers, G., Gee, J.P., et al: Consultative Total Parenteral Nutrition Teams: The Effect on the Incidence of Total Parenteral Nutrition-Related Complications. Journal of Parenteral and Enteral Nutrition 8(2), 1984, 146-152.

Dresser, R.S., Boisaubin, E.V.: Ethics, Law, and Nutritional Support. Archives of Internal Medicine, 145, 1985, 122-124.

III - Bibliography

Driver, A.G., LeBrun, M.: Iatrogenic Malnutrition in Patients Receiving Ventilatory Support. JAMA 224(19), 1980, 2195-2196.

Elliott, J.: Squaring Off over Total Parenteral Nutrition. JAMA 243 (16), 1980, 1610-1611, 1616.

Eschwege, H., Grant, M., Schmeer, L.: Nutrition Training of Health Professionals: Statement Before the Subcommittee on Nutrition of the Senate Committee on Agriculture, Nutrition, and Forestry. Journal of Parenteral and Enteral Nutrition 4(2), 1980, 206-209.

Evans, A.L., Brody, B.A.: The Do-Not-Resuscitate Order in Teaching Hospitals. JAMA 253 (15), 1985, 2236-2239.

Evashwick, C.: Home Health Care: Current Trends and Future Opportunities. Journal of Ambulatory Care Management 8(4), November 1985, 4-17.

Fackelmann, K.: New HCFA Regulations could put Chill on Skilled Nursing Home Healthcare. Modern Healthcare 15(7), 1985, 80-84.

Fackelmann, K.: Top Firms Guarded Market Share in '84. Modern Healthcare 15(12), 1985, 160-161.

Greenlaw, C.W.: Pharmacist as Team Leader for Total Parenteral Nutrition Therapy. American Journal of Hospital Pharmacy 36, 1979, 648-650.

Grimaldi, P.: Looking Closely at Nutrition Support. Nursing Management 15(8), 1984, 20-21.

Grundfest, S., Steiger, E.: Home Parenteral Nutrition. JAMA 244(15), 1980, 1701-1703.

Hain, W.F., Howell, B.B., Crosby, L.O., Mullen, J.L.: Design Considerations for Multidisciplinary Continuing Education Programs. Journal of Parenteral and Enteral Nutrition 6(6), 1982, 522-525.

Hushen, S.C.: Questioning TPN as the Answer. American Journal of Nursing May 1982, 852-854.

Hutchinson, M.: Educational Needs of Gerontological Dietitians. Gerontology & Geriatrics Education 4(4), Summer 1984, 15-17.

Ivey, M., Riella, M., Mueller, W., Scribner, B.: Long-Term Parenteral Nutrition in the Home. American Journal of Hospital Pharmacy 32, 1975, 1032-1036.

Kaminski, M.V.: Hospital Nutritional Support -- Are We Heading for Square One? Nutritional Support Services, August 1985.

Kaminski, M.V.: Nutritional Support: Can it be the Achilles Heel of the DRGs? Journal of Parenteral and Enteral Nutrition 8(5), 1984, 592-594.

III - Bibliography

Karnack, C.M., Gallina, J.N., Jeffrey, L.P.: Pharmacist Involvement in Home Parenteral Nutrition Programs. American Journal of Hospital Pharmacy 38, 1981, 215-217.

Kittleberger, S., Foltz, M.B., Shields, E.M.: Nutritional Support in the Long-Term Care Institution. (Ross Laboratories, Columbus, Ohio, 1984).

Koretz, R.L.: Nutritional Support: Whether or Not Some is Good, More is Not Better. Chest 88(1), 1985, 1-2.

Krup, C.: Comment by a Community Nurse. Geriatric Nursing 6(5), 1985, 273.

Kuntz, E.F.: For-Profits Adding Home Healthcare to Aid Bottom Lines. Modern Healthcare 14(7), 1984, 168-170.

Ladefoged, K.: Quality of Life in Patients on Permanent Home Parenteral Nutrition. Journal of Parenteral and Enteral Nutrition 5(2), 1981, 132-137.

Long, J.M.: Opening the Closet Door: The Key is Education. Journal of Parenteral and Enteral Nutrition 6(4), 1982, 280-285.

MacBurney, M., Wilmore, D.W.: Rational Decision-Making in Nutritional Care. Surgical Clinics of North America 61(3), 1981, 571-582.

McShane, C.M., Fox, H.M.: Nutrition Support Teams -- A 1983 Survey. Journal of Parenteral and Enteral Nutrition 9(3), 1985, 263-268.

Mechanic, D.: A Cooperative Agenda for Medicine and Nursing. New England Journal of Medicine 307(12), 1984, 747-750.

Meyers, D.W.: Legal Aspects of Withdrawing Nourishment from an Incurably IllPatient. Archives of Internal Medicine 145, 1985, 125-128.

Mullen, J.L.: Consequences of Malnutrition in the Surgical Patient. Surgical Clinics of North America 61(3), 1981, 465-485.

Nathanson, M.: Payment Incentives Feed Controversy over Advantages of Nutritional Support. Modern Healthcare 14(7), 1984, 42-45.

National Academy of Sciences. Nutrition Education in U.S. Medical Schools, Committee on Nutrition in Medical Education, Food and Nutrition Board. (National Academy Press, Washington, D.C., 1985).

Nehme, A.E.: Nutritional Support of the Hospitalized Patient: The Team Concept. JAMA 243(19), 1980, 1906-1908.

Nestle, M.: Nutrition Instruction for Health Professions Students and Practitioners: Strategies for the 1980s. Journal of Parenteral and Enteral Nutrition 6(3), 1982, 191-193.

III - Bibliography

O'Donnell, K., Church, L.: Home Care can Aid Diversification, but Advance Planning's a Necessity. Modern Healthcare 15(19), 1985, 154-156.

Padilla, G.V., Grant, M., Wong, J. et al: Subjective Distresses of Nasogastric Tube Feeding. Journal of Parenteral and Enteral Nutrition 3(2), 1979, 53-57.

Paris, J.J., Reardon, F.E.: Court Responses to Withholding or Withdrawing Artificial Nutrition and Fluids, JAMA 253(15), 2243-2245.

Peteet, J.R., Medeiros, C., Slavin, L., Walsh-Burke, K.: Psychological Aspects of Artificial Feeding in Cancer Patients. Journal of Parenteral and Enteral Nutrition 5(2), 1981, 138-140.

Punch, L.: Chains Expand their Operations, Expecting Prospective Pay Boon. Modern Healthcare 14(7), 1984, 131-138.

Rhoads, J.E., Vars, H.M., Dudrick, S.J.: The Development of Intravenous Hyperalimentation. Surgical Clinics of North America 61(3), 1981, 429-435.

Schneider, P.: The Pharmacist's Role in Inpatient and Home Care Hyperalimentation Programs. Hospital Pharmacy 13, 1978, 71, 74, 77.

Schroeder, S.A.: Curbing the High Costs of Medical Advances. Business and Health 1(8), 1984, 7-11.

Scribner, B.H., Cole, J.J., Christopher, G. et al: Long-Term Total Parenteral Nutrition: The Concept of the Artificial Gut. JAMA 212(3), 1970, 457-463.

Scribner, B.H., Cole, J.J.: Evolution of the Technique of Home Parenteral Nutrition. Journal of Parenteral and Enteral Nutrition 3(2), 1979, 58-61.

Seltzer, M.H., Slocum, B.A., Cataldi-Betcher, E.L. et al: Specialized Nutrition Support: Patterns of Care. Journal of Parenteral and Enteral Nutrition 8(5), 1984, 506-510.

Shields, E.M., Kick, E.: Nursing Care in Nursing Homes, In: Nursing in the 1980s, Crises, Opportunities, Challenges, 195-210, edited by L. H. Aiken (American Academy of Nursing, J.B. Lippincott Co., Philadelphia, 1982).

Sims, L.S.: Smiciklas-Wright, H., Shannon, B.: Baccalaureate Degree Education for Nutritionists/Dietetic Professionals working with the Aging. Gerontology and Geriatrics Education 4(4), 1984, 19-22.

Steinbaugh, M.: A Critique of Recommended Subject Matter for Education of Nutritionists-Dietitians Working with the Elderly. Gerontology and Geriatrics Education 4(4), 1984, 9-13.

Steffee, W.P.: Nutrition Intervention in Hospitalized Geriatric Patients. Bulletin of New York Academy of Medicine 56(6), 1980, 564-574.

Twomey, P.L., Patching, S.C.: Cost-Effectiveness of Nutritional Support. Journal of Parenteral and Enteral Nutrition 9(1), 1985, 3-10.

Appendix I

List of Professional Associations

Dietitians/Nutritional Support Professionals

American Dietetic Association (ADA)
430 N. Michigan Ave.
Chicago, IL 60611
312-280-5000
James L. Breeling, Exec. Dir.
Members: 45,000
Dietetic practice group: Dietitians in Critical Care
713-626-5059

American Society for Parenteral and Enteral Nutrition (ASPEN)
8605 Cameron St., Suite 500
Silver Spring, MD 20910
301-587-6315
Barney Sellers, Exec. Dir.
Members: 3,500
Includes physicians, dietitians, pharmacists, nurses, social workers

Emergency Medical Technicians

National Association of Emergency Medical Technicians (NAEMT)
P.O. Box 627
102 W. Centennial
Boulder, MT 59632
614-261-4428
John Sigafoos, Pres.
Members: 20,000

National Registry of Emergency Medical Technicians (NREMT)
P.O. Box 29233
Columbus, OH 43229
614-888-4484
Rocco V. Morando, Exec. Dir.
Members: 200,000

Nurses

American Nurses' Association (ANA)
2420 Pershing Road
Kansas City, MO 64108
816-474-5720
Judith A. Yates, R.N., Exec. Dir.
Members: 180,000

National IV Therapy Association
Cambridge, MA
617-576-1282

Nurses (continued)

National League for Nursing (NLN)
Ten Columbus Circle
New York, NY 10019
212-582-1022
Margaret E. Walsh, CAE, Exec.Dir.-Sec.
Members: 17,800
Nationally accredits nursing education programs

American Association of Critical Care Nurses (AACCN)
One Civic Plaza
Newport Beach, CA 92660
714-644-9310
Edward A. Shaw, Ph.D., Exec. Dir.
Members: 44,000

American Association of Nephrology Nurses and Technicians (AANNT)
Box 56, North Woodbury Rd.
Pitman, NJ 08071
609-589-2187
Dawn T. Brennan, R.N., Pres.
Members: 5,129

American Association of Nurse Anesthetists (AANA)
216 W. Higgins Rd.
Park Ridge, IL 60068
312-692-7050
Nancy A. Fevold, Exec. Dir.
Members: 22,000

Emergency Department Nurses Association (EDNA)
666 N. Lake Shore Dr.
Chicago, IL 60611
312-649-0297
Torry Mark Sansone, Exec. Dir.
Members: 12,000

Pharmacists

American Pharmaceutical Association (APhA)
2215 Constitution Avenue, N.W.
Washington, D.C. 20037
202-628-4410
Dr. William S. Apple, Pres.
Members: 56,000

National Association of Boards of Pharmacy (NABP)
One E. Wacker Drive, Suite 2210
Chicago, IL 60601
312-467-6220
Fred T. Mahaffey, Exec. Dir.
Members: 57
Boards of pharmacy of 50 states

Pharmacists (continued)

American Society of Consultant Pharmacists (ASCP)
2300 Ninth St. S., Suite 503
Arlington, VA 22204
703-920-8492
R. Timothy Webster, Exec. Dir.
Members: 1,700
Concerned with nursing homes and long-term-care facilities

American Society of Hospital Pharmacists (ASHP)
4630 Montgomery Ave.
Bethesda, MD 20814
301-657-3000
Joseph A. Oddis, Exec. V.P.
Members: 21,000
Pharmacists employed by hospitals and related institutions

Association of Practitioners in Infection Control (APIC)
23341 N. Milwaukee Ave.
Half Day, IL 60069
312-634-1403
Members: 5,800
Includes physicians, microbiologists, epidemiologists, pharmacists, medical technicians and sanitarians

Physicians

American Medical Association (AMA)
535 N. Dearborn St.
Chicago, IL 60610
312-751-6000
James H. Sammons, M.D., Exec. V.P.
Members: 241,700

American Society of Anesthesiologists(ASA)
515 Busse Highway
Park Ridge, IL 60068
312-825-5586
John W. Andes, Exec. Sec.
Members: 18,500
Separate section: American College of Anesthesiologists

American Board of Anesthesiologists
100 Constitution Plaza
Hartford, CT 06103
203-522-9857
Members: 12
Certification board

American College of Emergency Physicians (ACEP)
P.O. Box 61911
Dallas, TX 75261
214-659-0911
Dr. Colin C. Rorrie, Jr., Exec. Dir.
Members: 10,900

American Board of Emergency Medicine
1305 Abbott Road, Suite 101
East Lansing, MI 48823
517-332-4800
Members: 6
Certification board

Physicians (continued)

American Academy of Family Physicians (AAFP)
1740 W. 92nd St.
Kansas City, MO 64114
816-333-9700
Roger Tusken, Exec. V.P.
Members: 50,000

American College of Physicians (Internal Medicine) (ACP)
4200 Pine St.
Philadelphia, PA 19104
215-243-1200
Robert H. Moser, Exec. V.P.
Members: 57,000

American College of Surgeons (ACS)
55 E. Erie St.
Chicago, IL 60611
312-664-4050
C. Rollins Hanlon, M.D., Dir.
Fellows: 46,000

American Board of Family Practice
2228 Young Drive
Lexington, KY 40505
Members: 19
Certification board

American Board of Internal Medicine (ABIM)
3624 Market St.
Philadelphia, PA 19104
215-243-1500
John A. Benson, Jr., M.D., Pres.
Members: 40
Certification board for specialists in internal medicine including cardiovascular disease, medical oncology, nephrology, pulmonary disease and other subspecialties

American Board of Surgery (ABS)
1617 John F. Kennedy Blvd.
Philadelphia, PA 19103
215-568-4000
Members: 44
Certification board

American Board of Thoracic Surgery
14640 East Seven Mile Road
Detroit, MI 48205
Members: 14
Certification board

Respiratory Therapists/Technicians

American Association for Respiratory Therapy (AART)
1720 Regal Row
Dallas, TX 75235
214-630-3540
Sam P. Giordano, R.R.T., Exec. Dir.
Members: 20,700

National Board for Respiratory Therapy (NBRT)
11015 W. 75th Terrace
Shawnee Mission, KS 66214
913-268-4050
Steven K. Bryant, Exec. Dir.
Members: 46,000
Offers credentialing examinations for respiratory therapists and technicians

Respiratory Therapists/Technicians (continued)

Joint Review Committee for Respiratory Therapy Education (JRCRTE)
1700 W. Euless Blvd., Suite 200
Euless, TX 76039
817-283-2835
Philip A. VonDerHeydt, Exec. Dir.
Members: 13
Develops standards for accredited education programs

Classification Systems for Decisionmaking for Critically Ill Elderly Patients

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CLASSIFICATION SYSTEMS FOR DECISIONMAKING FOR CRITICALLY ILL ELDERLY PATIENTS

Section 1. Introduction to ICUs and Decisionmaking Processes

Classification and aggregation of patients according to differential needs for care have been accepted as normal features of contemporary hospital practice. Children are put with other children, surgical patients are clustered with one another, and when possible patients with serious infections are set apart from all others. Although viewed by care providers as being done in the interest of offering optimal care (or in the case of serious infections, protecting other members of the hospital community), this aggregation of patients by level or type of care needed has been important both as a management strategy for making optimal use of resources and as a clinical strategy for providing an optimal level of care.

Classifying patients by need, although accelerated by the recent rapid increase in techhnology, is not a new phenomenon. It has been noted often that Florence Nightingale placed nearest the nurse's station those soldiers who had the greatest need for care. In addition, she has been credited with clustering postoperative patients where they could be observed and cared for most readily. The first was an adaption of military triage to hospital care; the second was an antecedent to the postanesthesia recovery room (PAR), which began to appear as an organizational and therapeutic strategy in United States hospitals in the 1930s. Not long after it appeared the PAR was called upon to accept other seriously ill patients who were expected to gain from the concentration of skilled personnel prepared to meet the needs of patients with transient serious postanesthesia derangement of body systems. Although accepted in some of the larger and more creative hospitals as an innovation that should be institutionalized, PARs were not introduced widely until after World War II.

The strategic and logistical problems of World War II, with the need for mobilizing unprecedented resources and deploying an enormous range of services, provided the impetus and the experience for many changes in medical care. Perhaps most striking in the speed and impact of its development was the increase in specialization of both personnel and other resources. Both the experience of working together and the recognized increased efficacy of treatment teams suggested to many thoughtful practitioners that the next wave of progress would be a transfer of this specialization to civilian medical practice. Rapid advances in technology created many new means for intervention and enhanced substantially the chances for recovery of many patients for whom the outlook for recovery had been grim. The iron lung, the positive pressure respirator, endotracheal intubation, and the cardiac and pulmonary artery catheters were but a few of the innovations that not only were created by specialization but also in turn impelled more exploration of the therapeutic limits to which specialization could lead.

These and comparable innovations changed both treatment and prognosis for at least some types of acute illness and hastened the development of hospital areas designed to offer more intensive care for the seriously ill. The first important change in staffing came in the 1960s when 24 hour physician coverage was added. The first specially designated area was the coronary care unit (CCU), which was developed in response to the ability to monitor cardiac activity and to intervene effectively in the event of a serious rhythm disorder or cardiac arrest. There developed successively, although not necessarily in this order, units for medical intensive care (MICU), surgical intensive care (SICU), and specialty units for neurosurgery, burns, trauma, etc. The growth of these units was spectacular. In 1951 recovery rooms had been developed in only 21 percent of community hospitals; by the early 1960s they were in use in nearly all hospitals. As for ICUs, in 1958 they were reported in only 25 percent of community hospitals of 300 beds or more. A decade later there were very few U.S. hospitals that did not have at least one ICU; some had more than one. It is difficult to recall another major innovation that has received such rapid and widespread adoption (Russell, 1979). The number and distribution of ICUs in the U.S. are reported in Table 1 (OTA, 1984).

Types and Characteristics of ICUs

ICUs have been designed, organized, and staffed to meet a variety of needs. All should have the ability to:

- care for severely ill or potentially severely ill patients;

* employ specially trained nurses on a one-nurse to a one-to-three patient basis;
* identify a physician as the director of patient care and administrator of the unit;
* have 24 hour acute care laboratory support, and
* provide a wide range of technological services, with the help of expert medical sub specialists and ancillary personnel [Cullen, 1977; and Myers, Schroeder, and Chapman, 1984 (as quoted in OTA, 1984)].

Depending on the size of the hospital, the ICU medical director may or may not hold a full time position. In all cases, however, it is imperative that there be a full time nursing director who has been carefully prepared for the position and to whom substantial decisionmaking authority has been granted for a wide range of services. It is urgent that a close working relationship be established and maintained between the medical and nursing director and that maximal stability be developed for all members of the ICU team.

There has been probing for the optimal means of combining or organizing the several clinical skills that often must be combined to assume effective patient care. Physicians in anesthesiology, internal medicine, pediatrics, and surgery (and its subspecialties) have made the most strenuous efforts to be included in the intensive or critical care team. Recognizing that effective treatment of critically ill patients often requires the combined skills of several specialties, representatives of the American Board of Anesthesiology (ABA), American Board of Internal Medicine (ABIM), American Board of Pediatrics (ABP), and American Board of Surgery (ABS) gained approval to form a multi-disciplinary subspecialty of Critical Care Medicine (CCM). After failing to agree on training criteria and other board prerogatives, the parties to the proposal have disengaged from the project, each apparently establishing its own critical care certificate program. Thus, although intensive/critical care training programs combine preparation in several relevant specialties, it appears that at least for the present there will be no board-recognized multi-disciplinary specialty in intensive/critical care (Grenvik, 1985). Furthermore, despite the territorial battles regarding subspecialty certification in critical care medicine, the reality is that the field will continue to grow, because serious body system derangements are often interrelated and will benefit from the collaboration of specialists. The critical care specialist functions as a resource person for management of ICUs, cost containment, and the resolution of medical and ethical conflicts at the bedside. The ICU physical configuration and staff organization should remain sufficiently flexible to reflect changing clinical and managerial needs.

Taking a census of ICU beds is difficult because of the variation in criteria for counting and reporting beds. This is a special problem with small institutions that may not differentiate, for example, between CCUs and ICUs. Representative statistics are displayed in Table 1.

The minimal technological capabilities that should be maintained by any ICU include the following:

- Cardiopulmonary resuscitation
- Airway management, including endotracheal intubation and assisted ventilation.
- Oxygen delivery systems with qualified respiratory therapists or registered nurses to deliver oxygen therapy.
- Continual electrocardiographic monitoring.
- Continual arterial and venous blood pressure monitoring.
- Access to rapid and comprehensive laboratory services including but not limited to arterial blood gas analysis, electrolyte determinations, hemograms, cardiac enzyme analysis, electrolyte determinations, renal function studies, microbiologic studies, fluoroscopy, and other radiological studies.
- Access to nutritional support, both enteral and parenteral.
- Titrated therapeutic interventions with infusion pumps.
- Additional technological capability consistent with the stated ICU mission and likely patient composition.
- Portable life-support equipment for use in patient transport. (NIH, 1983)

The wide range of patients who have been presumed to benefit from ICU care has led to continuing discussion on whether to establish one or more multi-specialty ICUs to treat both medical and surgical patients or to establish separate ICUs for patients with similar problems. In small hospitals concern for efficiency may dictate a multi-specialty unit, which may provide medical, surgical, and coronary care. Large hospitals may have more flexibility and may operate separate ICUs for coronary, medical-surgical, and subspeciality units. Although the demand in some larger hospitals has been for the creation of discrete subspecialty units, the overall trend seems to be toward the formation of multi-specialty units that can care for both medical and surgical problems. This development is a logical expression of the clinical impression that patients with special problems receive the most appropriate care where there is the most intense and single-minded concentration of resources. In most hospitals, however, this move has been resisted, probably for a combination of managerial and clinical concerns. From the managerial perspective very small units may be unjustifiably inefficient. From the clinical perspective it is apparent that relatively few clinical problems requiring intensive care exist in isolation. Thus, neurosurgical patients may have cardiovascular or renal system failure, pediatric patients may need intubation, etc.

The focus of this report is primarily on medical, surgical, and mixed medical-surgical ICUs. Patients in special units, such as those for burn, trauma, pediatric, and psychiatric care have a large proportion of special characteristics that make their inclusion here inappropriate. Furthermore, since patients for whom care is provided in specialty units may have many fewer common disorders of function than those in medical-surgical units, the variables upon which a classification system can be built will be substantially different.

Cost of ICU Care

Estimating the cost of ICU care is an extremely difficult task, one that is beset with both conceptual and technical problems. Conceptually, one can consider several alternatives for analyzing these costs based upon one or more of the following calculations: (OTA, 1984)

i) The direct and indirect costs of operating an ICU. These are relatively easy to estimate, but they have limited policy relevance. This method depends entirely upon ICU charges for room and board, which are usually underestimates. This calculation leads to an estimate of 8 to 10 percent of national inpatient hospital costs, which is almost certainly low.

ii) The total hospital costs, including the cost of ancillary services as well as ICU costs, incurred by patients when they are in the ICU. This method likewise depends on charge data. It is common knowledge that in ancillary services there is a charge mark up of 30 to 50 percent over actual costs. This calculation is less exact but would have greater policy relevance; it leads to an estimate of 14 to 17 percent of national inpatient hospital costs.

iii) The total hospital costs attributable to patients who spend any time in ICUs. These, like (i), are relatively easy to calculate from hospital charge data, but they have limited value in policy determination. They lead to an estimate of 28 to 34 percent.

iv) The incremental cost generated by ICUs above the cost a hospital would have to absorb for treating very sick patients who would remain in the hospital even if ICUs did not exist. Data are not available for this calculation. If they were, this method would have the most relevance for policy deliberations.

Interpretation of these estimates should be based on the following considerations:

a) The estimates include coronary care.
b) They do not include most physician services; neonatal, burn or pediatric units; or ICUs in Federal hospitals.
c) Hospital care accounts for approximately 40 percent of national health care expenditures. Of this, approximately 85 percent is for acute care in community hospitals.
d) Approximately 85 percent of community hospital costs are for inpatient care.

From these data it appears that ICU care consumes somewhere between .25 and 1 percent of the GNP. According to the calculation in (ii) above, 1982 costs for ICU care were in the order of $13 billion to $15 billion (OTA, 1984).

Calculation of per diem ICU cost is difficult for several reasons:

i) Whereas charges for general hospital care are usually set above costs to offset bad debts, discounted bills, educational programs, etc., charges for ICU care are usually set below actual cost (OTA, 1984).

ii) Despite their heavier use of billable physician services, ICU patients usually are not billed for physician services, nor are charges for them included in hospital cost calculations.

iii) The true cost of ancillary services is not reflected in ICU charges.

Studies in the U.S. have reported the ratio of per diem cost of ICU to non-ICU care to be in the range of 2.5:1 to 3:1. Statistics from other countries have been reported in the range of 2.5:1 to 5:1. Different accounting practices make critical comparisons impossible. One indirect outcome of the imposition of Diagnosis Related Groups (DRG) prospective payment may be the development of accounting systems that reflect "product costs" more accurately.

ICU Patient Profile

Assessment of the impact of ICU care on morbidity and mortality is dependent upon having a reliable profile of ICU patients. Although developed originally to provide brief interventions for patients with acutely deranged physiological functions, such as care for postanesthesia and trauma patients, ICUs have been expanded to care for patients with both more and less severe clinical problems. Thus, as CCUs developed there was great enthusiasm for including all patients for whom the diagnosis of myocardial infarction (MI) was likely, or even possible. At the other end of the scale there has been a strong tendency to include the most severely, and perhaps terminally, ill patients. As limits of ICU care have been extended in both directions, increasingly insistent questions have been raised regarding its effect upon morbidity and mortality, as well as the quality of life of patients during and after treatment.

For analytical purposes ICU patients can be classified in the following categories:

i) Those for whom the probability of survival is high and unlikely to be enhanced by ICU care. These patients may be placed in the ICU for any of a variety of reasons: to monitor physiological function or observe neurological status, in order to detect serious aberrations of function as soon as possible; to have the benefit of more intensive nursing care than is available in other patient care areas; or for postoperative care in the absence of complications or other specific indications. In general these patients use relatively few ancillary services and the cost of their care is well below both the mean and the median of ICU patients.

ii) Those for whom the probability of survival is low and unlikely to be enhanced by ICU care. These may include the elderly whose immediate acute physiological derangement is complicated by shock, coma, cancer, infection, or organ failure. These patients are heavy users of ancillary services. As a result, the cost of their care varies widely, depending directly on their length of stay, but is relatively high on a per diem basis. Some especially insistent questions arise. How long should treatment be continued in the face of a virtually hopeless prognosis? Is there a substantial difference between all-out therapeutic efforts and minimizing discomfort? Whose prerogative is it to make decisions regarding the intensity of care, and upon what evidence are such decisions justified? This report attempts to shed light on these questions.

iii) Those for whom the probability of survival is low to intermediate and for whom ICU care may have substantial impact upon survival. This is a larger and ill-defined group. Among them are patients suffering from severe acute intoxication (such as drug overdose) for whom intense but relatively brief intervention is crucial for survival. Others for whom the benefit of ICU care is less evident are those whose acute problem is complicated by chronic disease or organ system dysfunction.

iv) There may be another classification: those for whom the probability of survival may be decreased by imposing an iatrogenic component upon a fragile balance between illness burden and care. Cross infection and psychic exhaustion are but two examples that have been cited (Parillo and Ayres, 1984).

Conceptually, it would be helpful if early in the course of their illness patients could be classified reliably in the appropriate category. At least theoretically, this could help to inform decisions regarding the level of care that would correspond to both need and survival probability. In reality, however, patients have been assigned to ICU care on the basis of assumed need, often in an apparent crisis, and with little information regarding likely impact of more intensive care. The purpose of this project is to assess the status of patient classification systems and to project their utility in guiding both individual and aggregate decisions related to the use of ICU care.

Medical Decisionmaking

Traditional decisionmaking regarding need for admission to an intensive care unit, the types of treatments to be instituted, and length of patient stay depends, to a large extent, on the type of hospital in which the intensive care service is located; the additional resources that are available, such as telemetry, "step down", progressive care, intermediate, or subspeciality care units; and the number of beds available in the ICU.

In the majority of intensive care units, there is an "open" admission policy, with screening performed by a head nurse or by a resident in training who has been assigned to the unit. Most units have admission and discharge criteria, but these tend to be written as only general guidelines because of the heterogeneous population served by most medical-surgical intensive care units; in many situations they cannot be used as a simple algorithm for admission decisions.

The criteria for admission vary widely, depending on patient mix and type of hospital. In some hospitals without house staff training programs and with limited intermediate or telemetry options, many patients are admitted for observation (especially cardiac, neurological, or neurosurgical patients), for noninvasive monitoring, or for either more intensive or specific nursing services not available in general units. In other hospitals, such as tertiary care centers that have a well trained critical care house and attending staff, more discriminating decisions can be made about admission. In some university hospitals there are multiple specialty ICUs, including respiratory units, trauma units, neurosurgical units, cardiac surgery units, burn units, and medical ICUs. Admissions here are directed by subspeciality criteria. It is not always clear how patients in these specialty units are managed when multi-organ systems are involved. In some medical-surgical ICUs with critical care training programs, the attending physician usually must present convincing evidence why a patient should be admitted. This type of intensive care service may even send out an evaluation team to evaluate a patient's need for ICU care prior to actual admission.

The same may apply to a coronary care unit where a cardiology fellow-in-training or senior medical resident may review the patient's history and evaluate the electrocardiogram before a patient is accepted for admission. Here the issue is to distinguish patients with myocardial infarction who have a high risk of complications from patients with either low risk of complications or no myocardial infarction. Patients with a stable myocardial infarction, those on prophylactic lidocaine protocols, or those who are being evaluated to rule out a myocardial infarction may be admitted to a lower cost telemetry unit instead of a modern CCU that provides active therapy with thrombolytic therapy, intra-aortic balloon counterpulsation, and invasive monitoring.

There are no widely accepted criteria for distinguishing between those patients who should be admitted to ICU care and those for whom admission to other hospital units would be appropriate. It seems likely that in some ICUs a substantial proportion of patients are at low risk of complications and stand to gain little or nothing in the ICU beyond the benefits of intermediate or general floor care. No ethical problem would be raised if they could be identified properly and assigned to the lesser level of care as a normal outcome of the admission diagnostic work-up. This would make more resources available for providing care for patients admitted to ICU care for clear medical necessity. For the CCU Thibault and Mulley (1985) are attempting to provide such medical necessity guidelines to "streamline intensive care". They are evaluating patients with chest pain, syncope, and pulmonary edema. For example, a patient who has syncope (age under 70) with associated vasovagal, psychogenic, or unknown cause for syncope after a complete evaluation has a low risk of having a serious complication; on the other hand, a patient with a history of cardiac disease (including congestive heart failure, prior tachyarrhythmia) or some other high risk condition (including renal failure, unexplained hypotension, or a new or suspected new neurologic event) is at high risk for a serious complication and should be admitted to a monitored area (CCU or telemetry). This explanation could be extended to general ICU admissions.

Once the patient has been admitted, there arises a new set of decisionmaking problems that are related to treatment. These problems vary widely from the relatively simple ones in a CCU, where only one organ system is involved, to the very complex ones in the ICU that is caring for patients with multiple organ system derangements. This situation can result in conflicting decisionmaking at the bedside among residents, nurses, primary attending physicians, consultants, and critical care specialists.

The effect of this type of problem can be minimized by setting up a decisionmaking apparatus in advance, as part of the organization of the unit. There seems to be a developing consensus that at a minimal staffing level this should consist of the physician and nurse director of the unit, who should work closely to develop unambiguous division of duties. Furthermore, there should be specific areas in which there is clear delegation of operating authority to the nurse director. This delegation is especially important in smaller hospitals where there are no residents in training and no full time ICU medical director. Programmed team work, including clearly delineated sharing of duties and responsibilities, is the key to success. Since this is very difficult to establish in a highly stressed clinical environment, every effort should be made to define the team and the duties of its members in advance.

Placement of the ICU within the hospital administrative hierarchy is a related problem. It is often recommended that the medical and nursing ICU directors report administratively directly to the hospital CEO, with clinical guidance from a broadly-based critical care committee. It is also recognized, however, that traditionally structured departmental units do not necessarily work well together. For this reason a triad (ICU medical director, ICU nursing director, and an administrator) using program team management strategies may be more effective.

At the time of admission for each patient, there should be clear designation of the primary medical care coordinator and specification of those who will be authorized to write orders. The coordinator may be the primary attending physician, a senior resident, a specially trained intensivist, or other qualified physician. The American College of Surgeons has recognized these issues, especially for the multiple trauma patient in the Advanced Trauma Life Support certification program, which mandates the general surgeon/trauma surgeon as the captain of the ship.

In addition, in anticipation of possible conflicts or misunderstandings among specialists, someone must be designated in advance to resolve these conflicts. This usually is the medical director of the ICU, or a designee.

Another set of decisions must be made when services become restricted because of demand that exceeds the licensed bed capacity, by limitation of equipment, or, more commonly, by a reduction in available skilled nursing. The decisionmaking process should evaluate both the ICU and the hospital as a whole when beds become limited. Any discussions that may entail reducing admissions, accelerating discharges, and scaling down some treatments should include the nurse-in-charge (head nurse, nursing supervisor, clinical nurse manager) and the physician-in charge (assigned resident, triage officer at the bedside part time, medical director on call, or intensivist) as well as the patient's individual physician. This decisionmaking is hospital-specific and should include consideration of other available resources. Is there a capacity for expanding the overnight recovery room or a holding unit in the emergency room? Are there intermediate units? What are the bed count, severity of illness, patient mix, and nursing capacity at other units in the hospital?

When resources become even more restricted and decisions go beyond limited triage to include extensive triage, cancelling elective surgery, and considering the diversion of critically ill patients to other area hospital ICUs, medical decisionmaking is performed at a vastly different level. Discussions now include directors of nursing; chiefs of medicine, surgery, anesthesia, and the emergency room; the admitting office; and the representative of the hospital administration (the administrator on call). At some level, the severity of illness, the prognosis, any restrictions on care imposed by the patient or family ("code" vs. "no code" status), length of stay, and age of each patient are carefully re-evaluated.

Although the subject has not been studied carefully, it seems that in at least some circumstances ICU care can be modified or withheld without untoward consequences. For example in Singer's study of a serious restriction in skilled nursing staff in a predominantly coronary care unit-medical ICU, there were few poor outcomes recorded (Singer et al., 1983). The results may not be so benign under different circumstances. Furthermore, the stress placed on the decision makers as well as the care givers must be included in the overall evaluation when difficult decisions must be made regarding who gets care and who does not. A special problem is created by maintaining patients in an understaffed unit when the quality of care may be substandard. This bears directly on the larger issue of evaluation of ICU efficacy.

There are several issues relevant to the elderly. Many health care personnel and others believe that a stated preference for giving high technology critical care to patients with acute reversible disease in itself excludes patients with chronic disability, cancer, or old age. There are several related questions. Should age limits be imposed for various high risk surgical procedures, or for invasive monitoring? Should patients with certain severe disabilities, such as those having bed/chair existence, metastatic cancer, or old age with senility, be generally excluded from critical care units? Are there ways to measure "physiological age"? In a true triage situation, who should be given care if the choice is reduced to two patients, each of whom has identical severity of illness evaluations yet one is older? These are topics that must be resolved by consideration of clinical realities, cultural values, and ethical standards. These are discussed in Section 4.

Decisionmaking is also important in specifying individual treatment plans. Treatment options cannot always be applied according to a fixed algorithm for care. A patient with severe hemorrhagic pancreatitis, for example, can be treated in a number of ways, including low intervention, high nursing involvement (peritoneal lavage), extensive organ imaging (ultrasound, CT scan, liver/spleen scan), high surgical options (drainage, decompression, pancreatectomy), and invasive monitoring (arterial and Swan-Ganz catheters). Wide discretionary options do not necessarily mean that some interventions are excessive, nor do they provide a basis for having health care planners and payers select only the least costly method of treatment. When triage is being instituted, however, treatments requiring high nurse involvement may have to be limited. What is needed are better methods of classifying patients according to severity of illness and need for care that will facilitate multi-hospital comparisons of treatments and outcomes. For example, Ranson's criteria have been used to evaluate patients with pancreatitis (Ranson et al., 1974). Recently, Loirat has compared a series of patients with pancreatitis by utilizing Ranson's criteria compared to a general severity of illness measurement (the Simplified Acute Physiology Score) and found that the general severity measure was as good as the specific measurement (Loirat et al., 1983). If these comparisons hold for other specific diseases, it would be more useful to decision makers to use general severity scores, which allow comparison between one disease category and another.

The other major area for decisionmaking relates to medical ethics. For the physician who has only an occasional patient attached to life support, the problems are bewildering when it becomes obvious that the patient's chances are getting worse each day. It is all the more difficult because these patients often become incompetent to make decisions for themselves and generally have not clearly identified beforehand an individual to make decisions for them (a durable power of attorney for health care). How does the physician give advice to the family when there are so many shades of interpretation being offered by nurses and various consultants? How does the physician act on the family's wishes (especially if they include withdrawal of care), and how is that accomplished and documented? When does the physician utilize the hospital ethics committee ("prognosis committee"), the risk manager, the hospital lawyer, or the hospital administrator? These questions will be raised in Section 4.

Resuscitation of the critically ill patient who suffers cardiac arrest presents those concerned with an especially difficult problem. There have been attempts to clarify the alternatives by placing patients into more rational categories. These include:

1. Total support.

   All patients are presumed to be in this category upon admission and thereafter unless specifically reclassified. Critically ill or neurologically impaired patients with strokes in whom survival is expected remain in this category. Vital organ systems, although affected, are usually not irreversibly damaged.

2. Partial support.

   These are patients with functioning brain or potential for some brain recovery, who have irreversible cardiopulmonary or other multi-organ failure syndromes or are in the terminal stages of other incurable diseases (e.g., carcinomatosis). These patients may be treated vigorously or supportively, but only to the point of cardiac arrest. Examples of this would be patients with end-stage chronic obstructive pulmonary disease and patients with end-stage heart failure. If such a patient develops cardiac arrest in spite of all therapeutic effort, all treatment is withdrawn and the patient is permitted to die.

3. No extraordinary measure.

   These are patients for whom all active treatment seems meaningless, prolonging death rather than life; only comforting or pain relieving therapy should be given. Examples are patients with minimal brain function without hope for improvement. In these cases extraordinary measures such as defined below are usually not initiated and may be discontinued even if such discontinuation results in immediate death. These patients will not be resuscitated in case of cardiac arrest. In addition to CPR, other extraordinary measures that are withheld may include:

a. Arrhythmia control.
b. ICU admission.
c. Life support with respiratory devices.
d. Transfusions.
e. Invasive monitoring.
f. Intravenous nutrition.
g. Intravenous vasoactive medication.

These guidelines have not been widely adopted. Even where they have, decisionmaking remains difficult once therapy has already been instituted. These ethical dilemmas are all the more difficult when the family is fragmented or nonexistent.

There are also many areas where there are inadequate criteria for decisionmaking. These include indications for the evaluation of a large number of organ imaging techniques and invasive monitoring. What are the categories of patients for whom Swan-Ganz monitoring is beneficial? At what point should a patient with a surgical intra-abdominal crisis go directly to surgery as opposed to ultrasound, gallium scanning, or CT scanning? This also applies to a variety of patients whose prognosis is limited but who are not considered hopeless. There is usually a lack of criteria for decision for many patients on long-term mechanical ventilation. These are the so-called "failure to wean" patients who fit into various categories including those with primarily chronic pulmonary obstructive disease with respiratory failure, multi-organ failure, recurrent or uncontrollable sepsis syndromes, and patients with neurological failure.

There is additional discussion of these issues and problems in Section 4.

Incentives for Use of the ICU

Incentives for the development and expansion of ICUs have arisen from several sources. Perhaps most prominent have been the rapid development of new specialized technology, including heart and liver transplantation, professional acceptance of the technological imperative, rising consumer expectations, legally directed practice standards, and managerial concerns for making optimal use of resources.

Although concentrating acutely ill patients in one location in order to improve patient care outcome is not a new idea, it gained new strength with the development of the capability for bedside monitoring of cardiac activity and demonstration of the efficacy of prompt cardiac resuscitation. This was followed by the rapid development of distinctly new methods of monitoring and reversing abnormal cardiovascular and respiratory functions. For example, catheterization of the great arteries, the heart, and the pulmonary artery called for both new equipment, often very costly, and specialized clinical skills to use the equipment and to interpret the results effectively. Once the utility of new technology had been demonstrated, the technological imperative foreshortened the time for dissemination and adoption of these bold new strategies. Both hospitals and clinicians joined forces to set up new procedures and services, setting aside the cost effectiveness analysis that might have been prudent in at least some circumstances. Procedure-based retrospective reimbursement mechanisms, which virtually guaranteed payment for new services, only accelerated the trend for acceptance.

As word of clinical advances became widely disseminated their adoption was accelerated by the expectations of consumers, potential future patients. The obsession with a mechanistic view of health and disease, reinforced by widespread confidence in the power of technology, became a powerful wave of uncritical public support for virtually any new procedure that offered sharper diagnostic insights or hope for more definitive treatment. This wave of support was reinforced by several legal rulings that struck down the long-accepted community standard for acceptable practice. As a result, there was virtual elimination of the differential in acceptable standards of care between large urban teaching and research centers and smaller cities - and even relatively rural areas. Thus, several consumer-related factors reinforced the thrust for wide and prompt dissemination of new, costly, and often invasive technology. Physician concern for negligence claims supported the change.

Mere adoption of new technology, however, did not in itself create the ICU. Constant monitoring of blood gases, providing mechanical ventilatory support, and maintaining parenteral nutrition could have been carried out on the hospital's general care floor, albeit with somewhat more effort and cost. The concentration of specialized equipment and skilled clinicians in a discrete area of the hospital was, in fact, a managerial strategy for making optimal use of resources. Despite the relative freedom inherent in cost-based reimbursement, hospital management has always been obliged to husband carefully the scarcest of resources: well trained and capable personnel. Highly skilled nurses, physicians, and technicians can be most productive when their work is centralized and facilitated by ready access to necessary diagnostic and therapeutic support systems. Their skills are developed and maintained most effectively when the volume of work provides an opportunity for continuous challenge and team-building. It is a responsibility of management to create settings and resources that will enhance the work of clinicians. The ICU was the logical managerial strategy for creating an appropriate environment for new technology, both diagnostic and therapeutic.

Any managerial strategy that is a response to the evolving dynamics of new technology and personal skills can expect demands for change. As already noted, there have been advocates of multiple-purpose units. Without previously determined and well defined standards for ICU admission and care there has been considerable inter-hospital variation in the proportion of beds allocated to ICUs, often without careful assessment of the cost implications. Beds that are available tend to be used. ICU and

CCU beds are more costly than beds on other floors. An excessive number of beds, therefore, may lead to "inappropriate" use of the ICU/CCU for patients who are at low risk of death or complication and for whom the marginal utility of ICU/CCU care may be negligible. Several studies have emphasized cost savings that could be effected by more conservative use of the CCU (Singer et al., 1983; Fineberg, Scadden, and Goldman, 1984; Goldman et al., 1982). The same reasoning could be extended to the ICU.

There are several internal ICU management questions to which there are only tentative answers:

i) Is patient outcome influenced substantially by specialized nursing care? In the absence of controlled clinical trials the impact of nursing, as well as other intervention variables, will be difficult to determine. Ethical constraints are likely to prohibit clinical trials that involve withholding care that is supported by conventional widsom. Inter-institutional comparisons with nursing care a variable could shed some light on this and other intervention strategies. A valid intervention-free patient classification system is essential for this evaluation.

ii) What is the optimal size of the medical-surgical ICU? Management and clinical assessment at this time suggest eight to ten beds per unit. If the hospital needs substantially more beds, it is probably advisable to have several contiguous optimal sized units. This will permit some sharing of specialized equipment and staff without incurring the organizational disadvantages of a larger unit.

iii) What is the best organizational strategy for the medical staff? There are advocates for open staff vs. closed staff with regard to admission to the ICU and treatment privileges within the ICU. There are advocates for limiting activity in the ICU through specialized credentialling. There are also various degrees of reliance upon medical, surgical, or anesthesia residents at various levels of training, or upon cardiology, pulmonary, or critical care fellows. There seem to be no answers based upon firm outcome measures.

The concern for cost containment has led to several managerial strategies for modifying ICU treatment practices. In some cases unused beds have been closed rather than having them used inappropriately. In other cases there have been trials of step down or intermediate care units where telemetry and other monitoring can be carried out, but without the added cost of more invasive high technology care. At the other end of the care continuum there may be institutional pressure in some cases to transfer to other facilities those patients whose care is predicted to be very costly but who have only very limted resources for payment.

The changes that occur in ICU practice will almost certainly reflect the pressures affecting health care in general and institutional practice in particular. Technology will advance and social expectations for care will increase. The trend for providers to become more specialized will continue at the same time that many consumers seek better integrated care. At least for the present, cost containment will replace equity in the distribution of social benefits as a high priority concern. Regardless of the outcome of these and other tensions it will be important to investigate carefully the impact of managerial changes upon access to care, especially by the poor and the elderly, and upon the quality of care, as measured by not only longevity but also life quality. One prerequisite to investigation will be a means of stratifying patients at ICU admission according to seriousness of illness or outcome probability in order to evaluate inter-hospital, inter-physician, and inter-treatment variables for their impact on patient outcome.

Section 2. Description of Principal Classification Systems for ICU Patients

Contemporary patient classification systems for ICU patients can be divided into two main groups, depending upon the strategy used for their derivation. One strategy depends upon having a panel of experts identify variables that are believed to be associated with outcomes of interest and assign weights to variables in some interactive process that has been adopted to achieve consensus. This method has been described as a multiple attribute utility (MAU) model (Gustafson et al., 1983) or a scoring system. It assumes that panels of experts, using individual and collective judgement, can identify and assign weights to variables in a way that will yield reliable and valid estimates of the relationship between clinical variables, derived from diagnoses and interventions, and outcomes. In essence, it is a normative system.

Advantages of this method have been asserted to be: (i) the economy of using experts compared with the expense of gathering the large data bases necessary for statistical analysis to detect small differences, (ii) possible sensitivity of even large data bases to individual settings, (iii) expert physicians may be more adept at controlling for quality of care than statistical analyses, (iv) statistical analyses may have to depend on suspect or missing data (Gustafson et al., 1983). The extent of these asserted advantages is open for discussion.

Major examples of this method are the Acute Physiology and Chronic Health Evaluation (APACHE) approaches (Knaus et al.,1981; Le Gall et al., 1984; Knaus et al., 1985) and the Therapeutic Intervention Scoring System (TISS) (Cullen et al., 1974; Keene and Cullen, 1983).

A second method uses statistical modeling to relate empirical data for many variables from a set of patients to outcomes of interest. This is sometimes referred to as an actuarial approach (Gustafson et al., 1983). The first step in the statistical modeling process is data reduction; from all available variables, only those most highly associated with outcome in a multivariate sense are selected for inclusion in the final model. This means that while two variables might each be associated with mortality, both might not enter the final model if they are also highly associated with each other. For binary outcome variables (e.g., mortality), the statistical technique of multiple logistic regression analysis is appropriate for describing the relationship of the possible predictors to the outcome. With this technique, the method of maximum likelihood is used to determine objectively the statistical weights to be assigned to each variable.

The major advantage of this method is a higher level of objectivity in relating variables to outcomes. It is well known that individual opinions and personal interaction can play a large role in establishing normative standards or weights and that these factors may lead to substantial changes in weights over time. While weights assigned to variables using multiple logistic regression will change if new models are generated on different data bases, these weights will not be influenced by individual opinions.

Examples of this method are the Multifactorial Index of Cardiac Risk (Goldman et al., 1977) the Coronary Intensive Care Function (Pozen et al., 1980 and 1984) and the Mortality Prediction Model (MPM) system (Lemeshow et al., 1985).

APACHE-Type Systems

The APACHE system was introduced (Knaus et al., 1981) for specific application to general medical-surgical ICU patients. The original system is a combination of an acute physiology score (APS) and a chronic health evaluation. APS provides a score indicating the degree of acute illness, while the chronic health evaluation indicates functional status, productivity, and medical attention for approximately six months prior to ICU admission. In the original presentation of APACHE, it was stated that the worst value recorded for each measurement within the first 32 hours of ICU admission is used for compiling the APS score. In subsequent articles the time was amended to 24-32 hours. The possibility of repeating the measurements every 24 hours to reflect changes in severity of illness over time has been suggested but never validated. As with all scoring systems, a panel of experts identified the variables to be measured and assigned them weights.

The 33 physiologic measurements that constitute the APS score cover seven major systems: cardiovascular, respiratory, renal, neurologic, gastrointestinal, metabolic, and hematologic. Table 2 presents these variables. As can be seen in this table, each variable is scored on a 5 point scale. The "normal" range is assigned 0 points and other ranges are assigned weights from 1 to 4, depending upon the extent of a patient's physiologic or chemical derangement. For example, if a patient's most extreme mean blood pressure in the first 32 hour period in the ICU was 130, the patient would receive 3 points for that variable. Similarly, if the patient's Glasgow Coma Score was 4, the patient would receive another 3 points toward the total APS score. The sum of these assigned weights over all 33 variables on the list is the patient's APS score. Any variable not measured is assumed to have been unimportant for the patient's care and, therefore, normal. Clearly, patients with high scores are sicker and have poorer prognoses than do patients with low scores.

Table 3 presents the second component of the APACHE system, the chronic health evaluation. This component takes the form of a letter code ranging from A to D, with A representing good health with no limitations and D representing severe restriction of activity. It is used for descriptive purposes rather than for incorporation into a prediction of hospital mortality. Table 4 presents a copy of the checklist used to determine the chronic health status code.

To provide a measure that is more easily interpreted than the APS score, a logistic regression model has been presented

(Knaus et al., 1982b) that will convert the APS score to a probability of hospital mortality. Table 5 presents the variables and their associated statistical weights that are necessary to carry out this conversion. To compute a probability of hospital mortality based on this model, the APS score is determined, as are age, sex, and primary organ system failure. Each variable in Table 5 is multiplied by the coefficient presented under the column headed "B" and these products are summed. The resulting sum is called the "logit". A simple formula converts this logit to the required probability.

For example, a 43 year-old male is admitted to the ICU in respiratory failure. After 32 hours in the ICU an APS score of 15 is calculated. The logit for this patient would be

$$\text{logit} = .1481(15) + (43-40)(.0412) + 0(.1391) - 0.799 - 3.938$$
$$= - 2.3919.$$

This logit is converted to a probability as follows:

$$\text{Pr(hospital mortality)} = e^{\text{logit}}/[1+e^{\text{logit}}].$$

For this patient we have

$$\text{Pr(hospital mortality)} = e^{-2.3919}/[1+e^{-2.3919}] = .08.$$

Hence, this patient has an 8 percent probability of dying in the hospital.

APS has been validated in many hospitals, both in the United States and overseas (Knaus et al.,1982a and 1982b; Wagner, et al., 1984). Table 6 presents a validation of APACHE carried out at the George Washington University Medical Center ICU (Wagner, Knaus, and Draper, 1983). The classification rates suggest that the APACHE model was effective in estimating the probability of hospital mortality of ICU patients at this hospital.

Le Gall and his colleagues, concerned about the number of variables necessary for the calculation of the APS score, developed the Simplified Acute Physiology Score (SAPS) (Le Gall et al., 1984). This system is based on 13 of the 33 original APS variables, plus age, and utilizes essentially the same weights or point allocations as those variables in APACHE. Table 7 presents the SAPS variables along with their weights. To date no model has been published that allows for the conversion of SAPS scores to probabilities of mortality. Instead, an empirical table has been published summarizing the proportion of patients dying relative to calculated SAPS scores for 679 patients (Le Gall et al., 1984). This table is presented as Table 8. As can be seen, there is a general tendency for the proportionate mortality of patients to increase as the SAPS score increases.

A modification of APACHE, known as APACHE II, has been published recently (Knaus et al., 1985). This system is based on 12 variables, which constitute the modified APS component, as well as points assigned for chronic health status and age. Table 9 presents the variables in APACHE II along with their associated weights. Two major differences in the physiology scores of APACHE and APACHE II are the increased points assigned to renal failure and to neurologic status. In APS the maximal point score for serum creatinine is 4. In APACHE II the serum creatinine point score is doubled if the patient has acute renal failure, making the maximal point score 8. Similarly, points associated with neurologic status have been increased. In APS the points for Glasgow Coma Score range from 0 to 4. In APACHE II points are determined by subtracting the actual Glasgow Coma Score from 15. Thus, the maximal points for a patient would be 12. In APACHE II patients with no history of severe organ insufficiency and who are not immuno-compromised receive 0 chronic health points; patients who have a history of severe organ insufficiency or who are immuno-compromised receive either 2 points (elective postoperative patients) or 5 points (nonoperative or emergency postoperative patients). Age points in APACHE II range from 0 to 6.

As with APACHE, the resulting APACHE II score can be converted to a probability of hospital mortality by using a logistic regression model. The model for APACHE II (Knaus et al., 1985) is presented in Table 10. This calculation needs considerable additional information beyond the APACHE II score. It includes whether the patient had emergency surgery and requires a single selection from a long list of principal diagnostic categories leading to ICU admission for nonoperative or postoperative patients or major organ system failure if the diagnosis is not included on the list. There are 29 principal diagnostic categories listed for nonoperative patients and 21 categories for postoperative patients. Each diagnostic category has its own assigned weight. The mathematical processs necessary to derive the probability of hospital mortality again involves computing the logit and then transforming this into a probability by the formula given above.

TISS System

Introduced in 1974 (Cullen et al., 1974) and modified in 1983 (Keene and Cullen, 1983), TISS was designed to classify ICU patients according to the severity or invasiveness of the therapeutic interventions used for their care. Table 11 presents the 57 interventions and associated points as listed in the 1974 version; Table 12 presents the 76 variables and associated points for the 1983 version. All interventions have been weighted from 1 to 4 by clinical consensus. For either version, interventions fall into four categories and vary from controlled ventilation with or without PEEP (4 points) to urinary catheter (1 point). Every 24 hours, a nurse records the highest level of intervention for each variable. The TISS score is the sum of the points associated with each intervention experienced by the patient within the particular time period. Patients have been categorized in accordance with their TISS scores. For example, Class I patients accumulate less than 10 points; Class II patients accumulate between 10 and 19 points; Class III patients accumulate between 20 and 39 points; and Class IV patients accumulate 40 or more points.

TISS has been designed to monitor or reflect improvement or deterioration in a patient's condition during ICU care. It has not been advocated as a means to arrive at a probability of hospital mortality. Patient deterioration has been correlated with increasing intervention as measured by increasing TISS scores; conversely, lower TISS scores have been associated with survival and return of function.

MPM System

Lemeshow, Teres and colleagues have developed an alternative procedure for calculating a patient's probability of hospital mortality (Lemeshow et al., 1985a). Multiple logistic regression analysis was employed to select, from hundreds of available variables, those that were most predictive of mortality. The following models have been generated using this methodology.

A. Admission Models

Two admission models have been generated on an original cohort of 737 ICU patients in a large teaching hospital. The first, (Lemeshow et al., 1985a) contains 7 variables that are presented in Table 13. The terms in this model have been carefully defined and are presented in the data collection form contained in the Appendix. This model has been designated "$MPM_{0(OSF)}$"[*].

One variable in this model could present some difficulty for data collectors. Specifically, "number of organ system failures" may be difficult to determine, since data must actually be collected on each of eight organ systems (cardiac, vascular, respiratory, gastrointestinal, renal, metabolic, hematologic and neurologic) to determine whether any is in failure. To eliminate this problem, the modeling process was repeated, not permitting "number of organ system failures" to enter the model. The variables in the resulting model were identical to the variables in the original model, with the exception that the variable "CPR prior to ICU admission" entered the model in place of "number of organ system failures". This modified model, termed "$MPM_{0(CPR)}$", is presented in Table 14 where it is noted that the statistical weights of the remaining variables changed slightly with "CPR prior to admission" in the model instead of "number of organ system failures".

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[*] $MPM_{0(OSF)}$: "0" indicates that data are collected at time 0, i.e., at ICU admission; "OSF" indicates inclusion in the model of the variable "number of organ systems in failure".

Use of either of these admission models provides a direct estimate of the probability of hospital mortality at the time a patient is admitted to the ICU. The $MPM_{0(CPR)}$ is based on seven readily obtained ICU treatment-independent variables that should, theoretically, be easy for data collectors or ICU nurses to record after only minimal training.

To illustrate the calculation of the probability of mortality based on the $MPM_{0(CPR)}$, consider a hypothetical patient 50 years of age who presents with cancer of the colon, a perforated bowel, and systolic blood pressure of 80 mmHg, and is admitted to the ICU after emergency surgery. Table 15 shows the necessary calculations for such a patient; from this it is seen that the probability of mortality in the hospital is 73 percent. As with the APACHE methods, it is necessary to first compute the logit (in this example 1.007) and then use this in the same formula as presented earlier for determining the probability of hospital mortality. At present, through the use of microcomputer spreadsheet packages, the computational complexity of the multiple logistic regression equation can be significantly reduced (Lemeshow et al., 1985b). Obviously this solution to the problem of solving a complex mathematical equation requires the availability of a microcomputer and at least minimal working knowledge of a spreadsheet package. This process could be greatly facilitated for widespread use by the development of specialized computer software incorporating such features as error checking, on-screen prompts, and report generation.

Both $MPM_{0(OSF)}$ and $MPM_{0(CPR)}$ have been successfully validated on a new cohort of 1,997 consecutive ICU patients at the same hospital (Teres et al., submitted for publication). Table 16 presents the classification rates for the two models. Table 17 presents the goodness-of-fit tests. These tables suggest that either model could be used effectively at this hospital for estimating the probability of hospital mortality of general medical-surgical ICU patients.

One additional admission model has been developed using the 2,734 patients that constitute the combined estimation and validation data sets. The purpose of generating this model was to verify that no variables were overlooked or weighted in a very different way than was the case in either $MPM_{0(OSF)}$ or $MPM_{0(CPR)}$. This new model has been designated "$MPM_{0(comb)}$", and is presented in Table 18. $MPM_{0(comb)}$ contains each of the seven $MPM_{0(CPR)}$ variables plus four other variables. The classification table and goodness-of-fit test for this model are presented in Table 19.

The $MPM_{0(comb)}$ model is not yet ready for widespread use, since it still must be validated on new patients, both within and outside of the original hospital.

B. 24 Hour Model

The published 24 hour model (Lemeshow et al., 1985a) was based on the 458 patients remaining in the ICU at 24 hours out of the original cohort of 737 patients. This model did not validate successfully on the 1,209 patients who remained in the ICU at least 24 hours out of the 1,997 patients in the validation data set. The failure of this original model may be due, in part, to the small number of patients on which the 24 hour model was originally generated.

A new 24 hour model was generated on the combined estimation and validation data sets. This pooling of 2,734 patients made it possible to develop the 24 hour model on 1,666 patients who spent at least 24 hours in the ICU.

This new model, referred to as "MPM_{24}", is based upon 14 variables and is presented in Table 20. Although this model is more complex than the admission model, data for it should be collectable at the patient's bedside by an ICU nurse with moderate training as a data collector. Table 21 presents the classification table and the goodness-of-fit test for this model which suggest that the model fits the estimation data set extremely well. [Note: "estimation data set" in this context means the combined estimation and validation data sets. It is the data set from which the model was generated.] This model has not yet been validated on either an internal or an external data set.

C. 48 Hour Model

Using the expanded estimation data set, it was possible to generate a 48 hour model based on 994 patients remaining in the ICU for 48 hours.

This new model, referred to as "MPM_{48}", is based upon 11 variables and is presented in Table 22. Data for this model also should be collectable at the patient's bedside by an ICU nurse with minimal training as a data collector. Table 23 presents the classification table and the goodness-of-fit test for this model which suggest that the model describes the mortality experience of the estimation data set extremely well. Before this model can be recommended for widespread use, it has to be validated on new sets of patients.

D. Probabilities Over Time

In addition to having a probability or severity measurement available at the time of ICU admission that does not incorporate ICU treatment, the other strategy of MPM is to provide estimates of the probability of hospital mortality at specified time intervals (at ICU admission, 24 hours, and 48 hours). The 24 hour and 48 hour models allow for response to treatment. Use of these sequential probabilities is presently being studied.

Section 3. Comparison of Predictive Classification Systems for ICU Patients

Introduction

One consistent thread of recorded history has been a virtually continuous series of attempts to clarify personal and communal experience in a way that could give either meaning or a sense of order to the wide range of sensory stimuli. For centuries schemata have been derived to explain death and deviations from acceptable well-being. Explanations often combined descriptions of common features of disorders and attributes of causation: the first was the result of observation, the latter was more often a function of religious or other cultural beliefs. Most of these early descriptions and explanations are viewed as being earnest but seriously flawed by lack of objectivity.

Beginning with the Enlightenment in the 18th century, western Europe entered a new era of greater reliance on empirical observation and less on superstition, folklore, and imagination. Technical developments enhanced the power to observe, and the science of mathematics and probability made it possible to draw justifiable conclusions from data. Still, however, the emphasis in medicine was upon describing phenomena and attempting to determine causation. As Feinberg (1983a) has noted, until very recently medical science has been concerned with explication, with defining the what, how, and why of disease. There has been much less careful analysis devoted to prediction. Prognosis has been a rule-of-thumb, not an analytical, exercise.

The ICDA is one interesting contemporary example of this emphasis. Classification has been based largely upon description of the expressions of disease agents [symptoms, signs, apparent site(s)], or their etiology or pathophysiology. Disease severity has been described in terms of either the intensity of deviation from normal function or feeling or by empirical description of past experience with outcomes: mortality, morbidity, or impaired function. The balances between etiology and outcome, between site and function have shifted from time to time as the result of increased knowledge. Recent startling advances in technology have introduced a new dimension to health care. It seems appropriate now to focus some of the efforts at classification upon the prediction of disease outcomes and the effects of intervention.

The thrust of this report is to describe the status of patient classification systems, especially as they contribute predictive power to the decisionmaking process in patient care. In particular, the report could be viewed as summarizing information and experience related to the hypothesis:

> There is a predictable relationship between early valid measurement of ICU patient characteristics and patient survival.

Use of a Patient Classification System in Decisionmaking

A patient classification system could be helpful in decisionmaking in one or more of the following ways:

i) For admission to the ICU. Many ICU admissions are in response to an emergency (e.g., severe trauma, cardiac arrest, coma) when it is probably inappropriate to deliberate at length on the prudence of admission. For a large proportion of patients, however, admission is more discretionary. This is especially true of older patients who are much less likely to be admitted for trauma than for treatment of an acute medical or surgical problem, possibly complicated by an underlying chronic ailment or organ system failure. To be optimally helpful at this time, the classification system should be based on observations that can be made at or before admission.

ii) For care management. If a classification system has been demonstrated to have high predictive power for patient survival, it could provide valuable data for management of patient care. Thus, if it demonstrates with acceptable validity that a patient entering with a given set of characteristics has a minimal survival probability, it could be very helpful in reaching a decision regarding the aggressiveness of care that would be acceptable to the patient, the family, the clinicians, and the hospital. For example, if there were objective survival predictions:

- * DNR (do not resuscitate) decisions could be easier to make or support
- * all concerned with limits of care could be reassured regarding legal liability
- * the deliberations of hospital ethics or prognosis committees could be carried out with a more objective data base.

iii) For monitoring patient progress. A classification system that incorporates both patient admission characteristics and treatment variables could be helpful in either validating or questioning clinical judgement regarding care or progress. Difficult discharge/transfer decisions could be made more easily and with less concern for subjective bias.

iv) For guiding resource allocation. In the short run operating decisions have to be made regarding the need for nursing staff, which must be responsive to the intensity of patient need, or for admission/discharge decisions, especially under the pressure of bed shortage. In the long run decisions are needed to determine the proportion of hospital resources that should be allocated to ICU care. Although most would argue that these decisions should not be based upon calculations of cost effectiveness alone, there could be broad agreement that decisions should be based at least in part on data related to efficacy, effectiveness, and efficiency of ICU care. Socially responsive decisions can be made only when these more or less objective observations are related to social values and to economic and political realities. Survival predictions could make a useful contribution to allocation decisions.

v) For comparing the effectiveness of therapeutic interventions and settings. Since it is clearly unethical to subject seriously ill patients to randomized clinical trials, other research strategies will be necessary. The validity of observations can be assured only when patients subject to different intervention patterns can be demonstrated to have essentially identical illness profiles and probabilities for survival/death.

vi) For modifying DRG allowances to account for variation in intensity of illness (and, presumably, the cost of care) on the basis of empirically derived statistics.

vii) For establishing comparison with referent or normative standards for care. The Joint Commission for the Accreditation of Hospitals and/or state licensing boards may establish standards for ICU use and patient care outcomes. Standardization of patient profiles will be essential, if this occurs.

Characteristics of an Ideal Patient Classification System

In order to be useful for decisionmaking for critically ill elderly patients, the following characteristics of a patient classification system are considered to be desirable.

i) The model should have strength in predicting survival (or death) upon admission to the ICU. Age should have been evaluated as a predictive variable.

ii) It should have high reliability, validity, sensitivity, and specificity.

iii) In the absence of a perfect system, data should be based on criteria that have been derived as objectively as possible. Criteria determined by clinical consensus are generally viewed as being less objective than those that have been determined empirically (Wasson et al., 1985).

iv) Data should be readily available, preferrably, recorded routinely in the course of admission evaluation or treatment.

v) Data should be easily transcribed or interpreted by available personnel without rater reliability.

vi) Outcome benefits of the system should justify the extra costs of gathering and processing data and of incorporating the results into clinical and/or organizational decisionmaking.

vii) Data gathering should be accomplished with no impact on patient care and minimal impact on ICU routine.

viii) Face and content validity should be high.

ix) Inter-hospital reliability should be high. Any system that has not been validated in multiple settings may be institution-specific. If this is so, it will have less widely applicable value for clinical decisions and policy determination.

A. Comparison of Systems with Major Relevance to the ICU

Introduction

Since the primary focus of this report is to review and evaluate patient classification systems that may be useful in clinical decisionmaking for critically ill ICU patients, systems selected for major emphasis are those few that seem to offer the greatest promise for this purpose. In subsection A1, each of the three major systems selected

(APACHE, TISS, MPM) has been analyzed by considering discrete characteristics reflecting its utility and cost. In general these characteristics describe the data base, model development and evaluation, cost, and potential uses of each system. This summary is intended to correspond to the composite Table 24. Subsection A2 is a comparison of APS, SAPS, and MPM on a common cohort of ICU patients. Subsection B presents a brief discussion of classification systems that are less appropriate for the ICU.

A1. Summary of Characteristics of Systems Relevant to the ICU

Data Requirements : Number and Availability of Variables; Time of Collection (Columns A-C)

Introduction

This characteristic defines the number and type of variables that have been used to develop the classification model. From this characteristic, plus others relating to the data base, one can make some inferences regarding the effort required for data gathering as well as the relative reliability of clinical and laboratory data and other sources of information. The presumption is that one important determinant of system utility will be the ease with which these data can be gathered and processed.

APACHE-Type Systems

Data are gathered for 12 to 33 variables over 24-32 hours of ICU care; some models include age, gender, and chronic disease. Missing values are assumed to be normal. Poor record keeping or hasty data gathering could lead to underestimation of the seriousness of illness. Inter-hospital variations in physician practice patterns (Chassin et al., 1980), if applicable to ICUs, would be reflected in intervention data and could influence seriousness of illness profiles. If this were true, it would compromise the validity of APACHE-type estimations of ICU mortality and make inter-hospital comparisons less valuable. In the absence of a previous hospital record, estimate of chronic illness is somewhat dependent on accuracy of patient recall of recent health problems.

TISS System

Data are gathered for 57 or 76 intervention variables each 24 hours during ICU stay. Variables are unweighted, despite intensity of intervention. Thus, for example, there is no differentiation between two and 24 hours of intubation. Inter-hospital variations in physician practice could influence seriousness of illness profiles. If data are collected from chart review, it may be difficult to locate documentation of the various treatments.

MPM System

For the admission models data are gathered on seven variables on admission only. There should be minimal problems with missing values. These models have the simplest data requirements of the major systems.

For the 24 hour and 48 hour models data are gathered for 14 or 11 variables, respectively, during 24/48 hours. Data gathering is somewhat more complex. There is a possible problem with missing values. Used serially with the admission models, these models could reflect changes in patient condition and may refine the predictive value.

Summary

Data requirements for all three systems are generally modest and objective, at least compared to some other classification systems, such as disease staging, that depend on much more detailed differentiation of clinical conditions. Of the APACHE-type systems, APACHE II and SAPS are dependent on the smallest number of variables. However, the chronic health status variable in APACHE II may have limited validity, since it is dependent in part upon active patient recall. Additional information must be obtained to convert the APACHE II score to a probability. The TISS system requires information for many more variables, but each is clearly specified and the information should be readily available if the record keeping has been good. In general, MPM models have the simplest data requirements. Most variables can be measured objectively; in the case of both admission models there should be minimal problems with missing values.

Data Requirements: Age and Chronic Disability
(Columns D and E)

Introduction

In the context of using a classification system for clinical decisionmaking for the elderly, age and chronic disease status are variables that are of particular interest.

Age

Since TISS scores are developed by aggregating ICU interventions, age is not entered as a variable. All other methods enter age as an independent variable. For APS and APACHE age is not entered in calculating the score but is added when the score is transformed to a probability. Both APACHE II and SAPS incorporate age in the calculation of the score, with points ranging from 0 to 6 in the former and 0 to 4 in the latter. Age is entered as a continuous variable in all MPM system models.

Chronic Disease

Chronic disease as a variable does not enter TISS, APS, or SAPS calculations. In APACHE chronic health status is recorded in a letter code, A (no functional limitations) to D (severe restriction of activity due to disease), but this is not entered in calculation of the score. In APACHE II chronic disease points (0 to 5) are added to the total score. Included in chronic disease is an assessment of immune status. The degree to which immune status has been compromised is relatively difficult to define clinically. The notation of it may be difficult to locate on record review. Chronic disease doeas not enter the MPM calculations, except as reflected in organ system failure, cancer, or renal failure.

Summary

Age enters APS and APACHE calculations only when the score is transformed to a probability; it enters both APACHE II and SAPS. It enters all MPM models as a continuous variable. Chronic disease enters APACHE and APACHE II, but not APS and SAPS; presence of cancer enters all MPM models and chronic renal failure is a variable in the combined admission model. Neither age nor chronic disease enters TISS calculations.

Data Requirements: Data ICU Treatment Dependent (Column F)

Introduction

If a classification system is to be useful for comparing severity of illness of patients in different ICUs or from different geographic regions, or if it is desired to control for severity of illness when comparing physician admission and treatment patterns or competing treatment modalities, it is important that the patient's condition be assessed with as little influence of treatment received in the ICU as possible. By the very nature of the function of ICUs, however, following admission it is impossible to separate the patient's condition from the treatments he/she receives. For individual patient management purposes it is less important to distinguish between treatment-dependent and treatment-independent observations..

APACHE-Type Systems

Since data may be collected up to 24 hours into the ICU stay, many of the variables could potentially be influenced by ICU treatment.

TISS System

This system makes no attempt to estimate severity of illness independent of ICU treatment and would be inappropriate for use in comparing ICUs.

MPM System

The $MPM_{0(OSF)}$ and $MPM_{0(CPR)}$ probabilities are each based on variables collected at the time of ICU admission and, as a result, do not depend upon treatment received in the ICU. The MPM_{24} and MPM_{48} hour probabilities may be influenced by ICU treatment.

Summary

Of all the models considered, only $MPM_{0(OSF)}$ and $MPM_{0(CPR)}$ are independent of the treatment a patient receives in the ICU. As a result, these are the only two models which are appropiriate for comparing hospitals, regions, physician practice patterns, or treatment modalities with respect to outcome, controlling for severity of illness.

Data Requirements: Complexity of Data Collection/ Personnel Requirements (Columns G and H)

Introduction

Adoption and use of any classification system will depend, at least in part, upon the perceived balance between marginal costs and marginal benefits associated with its use. This section considers some of the elements of marginal cost. For purposes of discussion this cost analysis is reported in terms of data collection and data analysis. Each, however, has implications not only for cost but also for quality of system input, which in turn affects validity and reliability of scores and predictive values. This analysis is not intended to be a definitive accounting of all institutional costs associated with adoption and use; this task is the province of the hospital's financial management staff. Data collection, quality, and cost are considered jointly, since it seems arbitrary and unrealistic to separate them.

APACHE-Type Systems

i) APS: Data collection is time consuming (33 variables) but data should be readily available in the patient's record. It is possible to collect the data with a minimal level of skill and supervision; it requires only familiarity with the medical record and thorough knowledge of medical terminology. Because of the number of variables, however, it is likely that additional personnel will be required, either in the ICU (extra clerk time) for on-site calculation of scores or in the record room for retrospective analysis. Calculating the APS score is simple addition on the scoring sheet; transforming the score to a probability requires a programmable device.

ii) APACHE: Time demands are comparable to those for APS, but a higher skill level is required for accurate assessment of chronic health status. As with APS, there probably would be need for additional personnel, either in the ICU (clerk) or in the record room.

iii) APACHE II: Because the number of variables has been reduced, time demands may be less. The addition of assessment of immune status, however, may introduce additional problems. Clinically, the judgement may be unclear; since the notation of immune status will be in the clinical notes it may be difficult for the data transcriber to locate it. Legibility of clinical notes (vs. a preprinted form) is always problematic. Calculating and transforming the score to a probability is analogous to APS and APACHE.

iv) Of all the APACHE-type systems SAPS makes the fewest demands for data collection, requiring data for only

13 variables plus age. It requires a minimal level of skill for transcribing data to scoring forms, either on site or in the record room. Score is achieved by simple addition.

TISS System

Both TISS versions present demands for only a minimal level of skill both to record and to transcribe data. They are somewhat more time consuming, however, in view of the larger number of variables (57 and 76 vs 12 to 33 for APACHE types). This system seems to require a moderate level of skill, since the patient's ICU record must be reviewed and all treatments accurately located, interpreted, and recorded. Once the data have been entered on scoring sheets only addition is needed to calculate the score.

MPM System

i) $MPM_{0(OSF)}$ and $MPM_{0(CPR)}$: Original recording of data is routine and simple, except for the estimate of organ systems in failure, which requires skilled clinical judgement. Transcription of data, once they have been entered in the record, is simple. A programmable device is needed for calculation of probability. This could be done directly in the ICU or later by the record room staff for retrospective studies. The requirements for $MPM_{0(CPR)}$ are essentially the same except that determination of CPR prior to ICU admission is easier than organ system failure. Of all systems considered, this seems to have the least burden for data collection/transcription.

ii) MPM_{24} and MPM_{48}: The 24 hour model requires clinical assessment of shock, so original observations are somewhat more complex. Of the two, the 48 hour model is somewhat simpler; the 24 hour model requires some special personnel effort for data collection. For transcription, both require a moderate level of skill in order to read and interpret patient records.

Summary

For original data recording APACHE and its component APS have relatively high time demands. Required clinical skill level for APACHE, however, is somewhat higher because of the inclusion of chronic health status. Variables are reduced for APACHE II, but valid assessment of immune status requires even more sophisticated clinical skills. For later transcription of data from clinical record to scoring form there may be a problem with locating and interpreting immune status information. Another step is necessary, using a programmable device, to generate a probability of death. Designation of primary diagnosis may introduce a subjective element, especially in the case of patients for whom Medicare reimbursement is diagnosis-dependent.

Transcribing TISS data from the patient record requires considerable time; orginal recording, however, should require no time, since it is an inherent part of patient care. A moderate level of skill is necessary for transcribing the data. Original recording of MPM data is relatively simple, except when organ system failure or shock must be noted. Transcription of data from record to data collection sheet is simple, as is derivation of a probability, if a programmable device is available.

Model Development: Selection of Variables and Assignment of Weights to Variables (Columns I and J)

Introduction

Each of the classification systems is based on a number of characteristics that must be evaluated on each patient. Once collected, the variables are weighted and combined, resulting in either a score or a probability of hospital mortality.

APACHE-Type Systems

A panel of experts considered the variables that could potentially reflect severity and included these in the system. The range of response for each variable was categorized by the panel from "normal" to increasing stages of derangement. Each category was assigned points ranging from 0 (for normal) to 4 (for extremely deranged).

TISS System

A panel of experts specified those interventions that would best reflect staffing needs. The panel assigned 1, 2, 3, or 4 points to each of the specified interventions depending upon the level of complexity and anticipated time involvement for the staff.

MPM System

From hundreds of variables collected on each ICU patient, statistical variable reduction techniques were used to select those variables most predictive of hospital mortality. Multiple logistic regression (MLR) models were developed to predict hospital mortality at specified time periods. Statistical weights assigned to each variable are an integral component of the MLR process.

Summary

The three systems are based on very different strategies for selecting the variables to collect and assigning weights to the variables. One technique involves the selection and weighting of variables by a panel of experts and can be thought of as "subjective". The other strategy is based on statistical methodology which is independent of subjective opinion.

Model Evaluation (Columns K-P)

Introduction

The models considered in this table have either been validated extensively or are currently undergoing validation. The results presented in this section of the table are based on different studies with different groups of patients. Only one study has compared some of the methods on a common cohort of patients. Results of that study will be described in detail in Section A2.

Results

There have been a number of published reports of validation studies of the APS, APACHE II, SAPS, and MPM models. In general, reported total correct classification rates ranged from 78 to 86 percent, sensitivity ranged from 40 to 60 percent, specificity ranged from 88 to 96 percent, predictive value of living ranged from 80 to 90 percent, and predictive value of dying ranged from 69 76 percent. No method surfaced as being clearly superior or inferior to others based on these criteria.

Summary

It is difficult to compare the classification rates summarized in this table, because they are based upon different cohorts of patients. As a result, differences may be due to case mix rather than the system used. However, it can be stated that all models seem to have a high degree of success in identifying patients who survive (specificity and predictive value of living) and are considerably less successful in identifying patients who do not survive (sensitivity and predictive value of dying). This observation may explain, in part, the reluctance of researchers to use these models for individual patient management. Because the number of patients who live is generally much higher than the number of patients who die, the total correct classification rate is respectable for all methods.

Cost: Automation and Staff Requirements for Data Collection (Columns Q and R)

Introduction

Once a particular severity system is determined to be useful for ICU patients, consideration must be given to the cost of implementation which results from two major sources - technological requirements and personnel requirements. These will be considered for each of the methods.

APACHE-Type Systems

Calculation of an APACHE-type score is a straightforward process of adding the points assigned each of the variables in the particular system used. Such computations can easily be accomplished with no special automation requirements. However, if it is desired to transform the score to a probability of mortality, calculations must be carried out with the assistance of either a programmable calculator or a microcomputer. With the latter, commonly available spreadsheet packages may be used to facilitate the computational process, eliminating the need for specially written computer programs. With APACHE the data gathering effort is significant, involving careful chart review. This would most likely be carried out by specially assigned personnel, since it is unlikely that this magnitude of data gathering could be made part of the usual nursing or physician routine while still assuring a high level of validity. The newer methods (i.e., APACHE II or SAPS) could conceivably be done by a bedside nurse, since they have more modest data requirements than their predecessor. It is highly unlikely that a busy nurse or resident could routinely determine principal diagnosis if conversions to probabilities are required.

TISS System

This method also involves careful chart review and data gathering. Computation of the TISS score involves simple addition and, as a result, no special equipment would be necessary. However, resources would have to be allocated for a data collector to assure a high level of validity, since it is unlikely that this effort could be effectively absorbed by the regular nursing or physician staff. Since nursing supervisors typically collect data for nursing assignment purposes, computation of TISS points could conceivably be made routine by collecting these data on a checklist which includes the full complement of interventions.

MPM System

The $MPM_{0(OSF)}$ and $MPM_{0(CPR)}$ involve only seven variables and could conceivably be computed quickly by the patient's nurse or attending physician. This is particularly true of the $MPM_{0(CPR)}$, since it does not involve the potentially complex task of determining which organ systems are in failure. Since the direct product of this method is a probability rather than a score, the assistance of a computer or programmable calculator is required. A microcomputer located in the ICU with appropriate software could provide, at the time of ICU admission, the probability of the patient's surviving to hospital discharge.

MPM_{24} and MPM_{48} involve a more intense data gathering effort than was necessary at ICU admission. It is possible that this task could be carried out effectively by the regular nursing or physician staff if they were appropriately trained, since they would be familiar with the patient. Again, use of a microcomputer is necessary.

Summary

These methods all require a committment to accurate data collection. In some instances, specially dedicated personnel would be advised. Computations for APACHE or TISS scores are easy and require no special computational technology. Converting APACHE scores to probabilities requires computer assistance as does determining probabilities of hospital mortality with the MPM system. For APACHE II, conversion to probabilities requires definitions to select principal diagnosis and specially trained data collectors would be required.

Uses: Clinical Decisionmaking (Columns S-W)

Introduction

Although there have been attempts to advance clinical decisionmaking as an objective science with a well-conceived paradigm for its development, results thus far have produced neither conceptual consensus nor a generally workable model for use by clinicians. Studies reported to date, have been centered largely on the physician's roles in determining diagnosis and selecting preferred treatment(s). These roles are sometimes referred to as explicatory and managerial decisions, respectively, that classify and label disease states according to their etiologic and pathophysiologic characteristics (Feinstein, 1983a).

With the advance of technology and the introduction of many new interventions, at least some of which have the potential for substantially altering the disease process and outcome, there is need for investing more energy in the development and evaluation of clinical management strategies and practices. It has been proposed that the development of new strategies will require new means of measuring and evaluating the "distinctively clinical and personal phenomena of patient care" (Feinstein, 1983d).

As a result of neglecting, or having no way to measure, such determinants or results of clinical decisions as probability of survival, likely post-therapeutic condition, and probable social impact, it has been difficult to design methods that would assist physicians in broadening their decisionmaking perspectives. What seems to be needed are improved ways of measuring important data that should be factored into clinical decisions. These data and the information derived from them should make it easier for treatment teams to discuss with ICU patients and/or their families the range of treatment options and their likely outcomes. In the context of this report, any prediction rule or algorithm that helps to classify patients according to outcome should make a substantial contribution to total patient care (Wasson et al., 1985).

In the following comparison of classification systems, attention is directed to their use in:

i) Admission to the ICU: The treatment team, headed by the medical director, becomes the gatekeeper of the ICU. Each admission is likely to be an attempt to make a rational decision in an emotionally charged atmosphere, a decision that has heavy implications for the patient, family, ICU staff, and the use of hospital resources. It is a decision that often must be made with less than optimal data.

ii) Definition of a management plan: Whereas the gatekeeper function may require rapid decisionmaking in a crisis atmosphere, the development of a management plan in many situations may involve more deliberation over alternative courses of action. It becomes more a continuing than an instant process, often involving family and religious counselor when survival probability is low. It is in this phase of clinical decisionmaking that ethical considerations may become a very important factor.

iii) Discharge from the ICU: These decisions usually are made with more complete clinical data and in a much less emotional atmosphere than those for admission. It may be difficult in a triage situation, when the choice may be who must be discharged to make a place for a much more critically ill admission.

The emphasis here is primarily upon individual clinical decisions. The fact that these decisions may have impact on others, as in the case of triage decisions, only emphasizes the impossibility of establishing a clean dichotomy between individual (clinical) and aggregate (resource) decisions. Furthermore, no classification system, regardless of its predictive power, can be used in isolation for ICU admission, management, or discharge decisions. It can be used only to inform those who understand it and its function in making clinical decisions. Used in this way it may help the treatment team in reaching consensus and in presenting a consistent interface with the patient and family. ICU patients and their families are likely to have a much higher anxiety level than most other hospital patients. Patients share some combination of above-average discomfort, threat to survival, and invasion of privacy; families often have ambivalent feelings when facing possible withdrawal of treatment from someone close to them. These and related concerns do not support calm, rational decisions. Furthermore, physicians and ICU nurses may share a measure of uncertainty, and may present different impressions or interpretations of prognosis to the family. Reliable and valid information regarding the predicted patient outcome could be extremely useful, as members of the treatment team discuss care with the patient and/or family. A treatment team recommendation based upon sound evidence that can be readily shared and understood will be especially helpful as all concerned wrestle with the very difficult ethical problems that are involved.

One problem that, as far as can be determined, has not been explored is the extent to which physicians will accept and incorporate scores derived from clinical observations into clinical decisionmaking for individual patients. Intuitively, it seems that they would react more positively to probabilities than to scores, but empirical evidence has not been found.

APACHE-Type Systems

APS, APACHE, APACHE II, and SAPS are all dependent on data not only at ICU admission but also over the following 24-32 hours. None, therefore, is useful for any decision at the time of admission, whether to admit or how to treat on the basis of predicted ICU outcome. As for discharge decisions, their only utility appears to be to verify with a low score (or transformation to a low estimate of mortality) a clinical impression that the patient has a relatively low intensity of illness and could, therefore, be transferred out of the ICU.

Triage refers to decisions made in the face of acute shortage of resources, such as when a critically ill patient presents for admission to a full ICU. Ideally, there should be an objective, bias-free means of assessing for each patient his/her clinical condition and the marginal utility for ICU care. This could lead, at least theoretically, to a rank-ordering of patient needs and potential benefits and to identifying the patient who could be transferred to floor care. Triage decisions will be easiest when both the mean probability of mortality and the marginal utility of ICU care are low; they will be most difficult when both are high. Furthermore, they may be influenced heavily by ethical concerns, which are discussed in Section 4.

All of the APACHE-type systems share handicaps in being used for triage. Since all require information that is gathered over at least 24 hours, they cannot be applied to patients until the end of the first day of ICU care. Since these systems have been validated for the first 24 hours only, their triage utility is severely limited. It may not be valid to compare the score for a patient in the ICU for one day to the score for a patient in the ICU for 10 days. It seems, therefore, that drawing inferences from APACHE-type scores or probabilities would not be helpful in triage.

As far as has been determined by this study APACHE-type scores have not been used to monitor or reflect patient progress, or regression, over time.

All APACHE-type systems probably are most helpful when scores have been transformed to probabilities. Intuitively, a probability expressed in percent has much more meaning than a figure on a linear scale. The additional step in transformation from score to probability may be some handicap.

TISS System

Since all variables reflect treatment, there is no way that TISS scores can be used, or even calculated, on admission. Since TISS can be collected daily, one might infer from low TISS scores that a patient has a low need for nursing services, since these bear some relationship to intensity of interventions. This could support a clinical recommendation for discharge or transfer. Since TISS scores over time provide cumulative information regarding the intensity of care, it might be possible to rank order patients by inferred severity of illness and to identify the patient(s) who could be transferred to care on another hospital floor with minimal risk of harm.

Since TISS scores reflect treatment, either during a 24 hour period or cumulatively over time, they can be used to monitor the amount of treatment received and, by inference, change in clinical condition.

MPM System

i) Admission: Since all information is available at the time of initial clinical evaluation, both the OSF and CPR models could be used to assist in decisions regarding admission to the ICU. Thus, except with a clinical diagnosis of drug overdose, which has a high probability of survival heavily dependent upon short term ICU care, a five percent probability of mortality might raise the question of the need for care. On the other hand, a 95 percent probability of mortality might raise the question as to whether ICU care would make a significant difference in outcome. Outcome probability estimates may be necessary (or useful), but they are not sufficient as the basis for admission decisions.

$MPM_{0(OSF)}$ and $MPM_{0(CPR)}$ probability estimates could be used, at least theoretically, to identify those patients whose clinical need is essentially for monitoring and who could be watched for early ICU discharge.

As for triage, the admission models, augmented by clinical judgement, could be used only at the admission end of triage decisions. Since they do not reflect either treatment intensity or subsequent clinical condition, they would have no validity for rank ordering patients to identify those most ready for ICU discharge. They would have no utility for monitoring patient progress. Since these models produce a direct outcome prediction at the time of admission, they are the most useful of all for helping the treatment team to develop a consensus regarding treatment plans. Likewise, of all systems reviewed they have the greatest potential at admission for assisting in the discussion of treatment plans with patients and/or family. This is the time, before a trend in clinical condition has become evident, when patient and family may be the most anxious and uncertain. Reliable and valid information that can be understood has the potential for being very useful.

As in the case for APACHE-type systems, physician acceptance and use have not been studied.

ii) 24 hours and 48 hours: Since data gathering is not complete for at least 24 hours, neither the MPM_{24} nor the MPM_{48} is useful for any decision at admission. Insofar as changing probability estimates show improvement over time, they may reinforce clinical impressions of improvement and readiness for ICU discharge.

Use of these models for triage is problematic. Obviously neither can be used for comparing patient outcomes prior to 24 or 48 hours. Furthermore, there is no provision for developing outcome estimates after 48 hours of ICU admission. Their use for establishing a rank order of patients on the basis of outcome prediction would be limited, therefore, to an interval of 24 to 48 hours after ICU admission. They could not be used for comparing at a specific time the outcomes of patients who had been in the ICU for different lengths of time.

MPM_{24} and MPM_{48} give direct estimates of the probability of hospital mortality. Obviously they would not be useful to the treatment team or family at admission. They could be useful whenever they can be calculated. Theoretically, they could be useful when viewed sequentially with either of the admission models, but this use has not been tested.

Uses - Quality Assessment (Columns X-AA)

Introduction

Assessment of the quality of health care is likely to become a topic of increasing importance. The introduction of new and costly high technology interventions will come into conflict with overall concerns for limiting the rate of increase in expenditures for health care. Aggregate social interest will be served best if the conflicts can be resolved with maximal reliance on a rational analysis of the needs, resources, and benefits of health services, both preventive and therapeutic. Quality assessment is often considered in terms of health care input, process, and outcome. Of these, outcome is the most important for measuring impact of services. It is essential for making cost-effectiveness estimates; it is also the most difficult to measure. It is the aspect of quality assessment with which this report is principally concerned.

One of the most serious problems facing both clinicians and administrators in measuring health care quality is the lack of experimental models that are feasible, reliable, and valid. The randomized clinical trial, which is a widely accepted model for clinical investigation, may be inappropriate for both ethical and strategic reasons for assessing ICU performance. In addition, it is very difficult to measure the complete benefits of clinical care, many of which have to be measured longitudinally in terms of relief, comfort, functional capacity, and quality of life (Feinstein, 1983d). Any strategy that offers substantial promise of yielding new information relevant to quality assessment deserves thoughtful evaluation and support.

These possible objectives of quality assessment have been selected for this review:

* Comparison of the overall performance of ICUs. Comparisons could be made either between each ICU and a referent unit or standard or among ICUs in strata determined by such characteristics as hospital size, location, teaching status, case-mix profile, etc.

* Comparison of selected interventions within or between comparable ICUs. This could be an indispensable strategy, even a requirement, for the introduction of new interventions.

* Comparison of physician admission and treatment practices. This is especially important, since it is physicians who control the clinical practices of hospitals and who are, therefore, the agents upon

whom cost and quality are most dependent (Young and Saltman, 1985).

APACHE-Type Systems

In order to evaluate any of these components of health care performance of ICUs, effectiveness of interventions, or physician practices, it is necessary to have an instrument that is not treatment-dependent. An instrument that includes treatment-dependent variables will be unable to distinguish between the effect of interventions and those of agents or settings. Each of the APACHE-type systems uses data from treatment-dependent variables; none of them develops a score or estimate of probability based solely on admission data. It is very difficult to understand how they could be used for assessment of care outcomes.

TISS System

TISS gathers data only from the record of interventions. It would be impossible, therefore, to use this method for evaluating ICU interventions or physician admitting practices; there could be no referent group or standard to which the observed could be compared.

In situations in which case mix or patient profile could be controlled, TISS could be used to investigate physicians' practice patterns. Some information could be gained about the outcome of cases, but it would be difficult to distinguish between the effect of physician practice patterns and the interventions themselves.

MPM System

i) $MPM_{0(OSF)}/MPM_{0(CPR)}$: Both admission models are dependent on variables that are collected on ICU admission. With control for patient case mix it should be possible to compare a subject hospital to a referent hospital by comparing mortality experience as an outcome measure. When comparing the treatment performance, comparisons would be easiest in the middle ranges of mortality prediction; they would be difficult at both extremes where large samples would be needed. This is not a serious handicap, however, since it is in this middle area of predicted mortality that the ICU should have its greatest impact on patient outcome. At both extremes of mortality prediction ICU care has very low marginal utility so validity of evaluation in these areas is less important.

Assessment of interventions is important, especially as new technologies may be introduced before they have been fully evaluated for effectiveness. In fact, their introduction could be justified at an earlier stage, thereby hastening possible benefits, if there were a feasible means of evaluating them on a continuing basis. These admission models could be such a means.

Physician practices, with respect to both admission and treatment, could be monitored, in a similar fashion, controlling for case mix and seriousness of illness.

ii) MPM_{24}/MPM_{48}: Since these both incorporate treatment-dependent variables, neither could be used directly for assessment of any of these aspects of hospital, treatment, or physician dimensions of care.

Summary

From the above it appears that only the $MPM_{0(OSF)}$ and $MPM_{0(CPR)}$ models are free of ICU treatment-dependent variables and are, therefore, the only ones of the major systems that could be used for assessment of ICU performance, treatment effectiveness, or physician practices in the ICU.

Uses - Resource Allocation: Institutional Management (Columns AB and AC)

Introduction

As noted in Section 1, development of ICUs can be viewed as a management strategy for concentrating and making optimal use of scarce resources: highly trained medical and surgical specialists in critical care medicine, nurses and other therapists specially trained for critical care support services, and costly equipment that reflects both established and new technologies. These and other resources have been dedicated to providing the most advanced care possible for critically ill patients, often with very little consideration of the cost of care.

Patient classification systems, on the other hand, have been generated for a wide variety of purposes, both clinical and managerial. Clinically oriented systems have been developed around etiology and diagnosis (e.g., ICDA), as aids to appropriate hospital admission (e.g., for coronary care), or as prognostic guides (e.g., Burn Index). With the increasing concern for cost containment, some systems designed primarily for clinical purposes (e.g., Severity of Illness Index) have been reviewed for possible use as managerial tools; other systems have been designed primarily for use in hospital management. This section reviews APACHE-type systems, the TISS system, and the MPM system for possible managerial use.

Management applications may be divided into those that could be useful in the short run, in day-to-day management, and those that would have primarily long range use, such as in major resource allocation. Since managerial strategies are not a primary focus of this report, these systems are reviewed for their use in only two representative problems: the short range planning for ICU nurse allocation and the long range problem of deciding what proportion of hospital beds should be allocated to ICU use.

Nursing Assignment (short term, day-to-day)

i) APACHE-types: These classification systems were developed to reflect seriousness of illness at a single point or relatively short period of time, not to follow patients over time. They rely to different degrees on variables that reflect preadmission, admission, and postadmission status. Although some variables are treatment-dependent, these systems do not rely sufficiently on intervention variables to be sensitive reflectors of either current or future intensity of nursing services. It is difficult to anticipate what use a hospital administrator could make of statistics derived from these systems.

ii) TISS system: These are entirely treatment-dependent and are able to follow patients over time, reflecting increasing or decreasing level of illness and need for care. It is plausible that from day-to-day the ICU nursing director could use aggregate TISS scores to estimate nursing needs for the next day or two.

iii) MPM system: There seems to be no respect in which these models differ from APACHE-types. They seem to have little or no use for short term management.

ICU Bed Allocation (long term)

The mean proportion of U.S. hospital beds allocated to ICU care varies by hospital size within a relatively narrow range (4.0 to 6.5 percent). Within each size stratum there is considerably more variation. Regional mean proportions of ICU beds, unstratified, vary from 5.0 to 7.0 percent (AHA, 1983). These differences reflect a number of factors including, for example, hospital case-mix, local practice patterns, and reimbursement mechanisms. Patient classification systems may have their greatest use in long-term resource allocation by documenting hospital case-mix patterns. Thus, a hospital with a case mix that consistently demonstrates a substantially higher than average intensity of illness could justify allocation of a larger proportion of beds to the ICU. This single indicator, however, does not act as an independently-sufficient determinant, since practice patterns and reimbursement would have to support the allocation. Each of the systems being considered may have some utility.

i) APACHE-types: Insofar as APACHE-type scores can be viewed as reflecting case mix they could be useful in documenting the mean intensity of illness of ICU patients. Using this information in conjunction with occupancy and other data, hospital management could have a potentially useful planning tool. At least this information could be helpful in documenting inter-institutional and geographic variations. Furthermore, it is possible that scores calculated throughout the ICU stay could be used for comparisons requiring case-mix profiles.

ii) TISS system: Information derived entirely from aggregating treatment experience would be useful for planning or long term management only if one assumes inter-hospital and geographic uniformity in practice patterns, an assumption that is not supported by empirical evidence (Wennberg and Gittelsohn, 1973; Chassin et al., 1986). Used in conjunction with case-mix information, however, it might be somewhat useful in reflecting local practice patterns and resource use in support of appropriate ICU bed needs.

iii) MPM system: The comments above regarding APACHE-types apply equally here. The one advantage of these models is that they are attempting to develop longitudinal projections of intensity of illness as reflected in probabilities of mortality.

Financial Implications for Institutions and the Health Care System (Column AD)

Introduction

Concern for the cost of health services has become much more acute in recent years as costs have risen steadily (now nearly 11 percent of GNP) with no evident limit. Since approximately 40 percent of the national health care bill is for hospital care, it is not surprising that major efforts have been made to control rising costs in this area. Responsibility for hospital cost increases has been attributed very largely to retrospective cost-based reimbursement, third party payment for services that removes direct financial impact on patient or physician and related increased intensity of care. Recent attempts to control costs have emphasized prospective payments to hospitals and shifting to consumers at least some of the cost of care (cost sharing).

In this cost control arena there have been two primary actors: on the one hand hospitals and other institutional providers of services and on the other hand third party payors for services. The important direct role of physicians has been very largely disregarded (Young and Saltman, 1985). Providers and payors have very different objectives. Hospitals and other institutions are intent upon maximizing income relative to cost; payors (in most cases insurance carriers, government, and industry) are compelled to keep health care cost below income from premiums, taxes, or sales. Both subscribe to a tacit but untested assumption that overall cost control can be achieved without an unacceptable deterioration in the quality of or access to care.

One cost control strategy that has received major attention is prospective payment based upon some concept of case mix as a proxy for appropriate resource use - and cost. The DRG system has been adopted as the case mix proxy for Medicare payments for hospital care and seems likely to gain wider acceptance in the future. From the payor's perspective it is a form of implicit rationing that transfers to providers the responsibility for making appropriate choices for reducing costs, if not services; for providers, such as hospitals, it is a Procrustean scheme that will spell disaster for some whose income needs are not met within reasonable limits by the mean level of reimbursement. With considerable justification, many consumers and their advocates have great concern for equity of access and the maintenance of an acceptable level of care.

There is widespread agreement that a rational and equitable prospective reimbursement system must be based on an appropriate case-mix analysis of hospital care. Ideally, the system should be easy to administer, but provide safeguards against manipulating the system; equitable in meeting the needs of diverse socioeconomic populations in different geographic areas; firm in maintaining quality of care; and sufficiently generous to allow for growth where necessary for adoption of important new technology and for expansion of essential services. The DRG system assumes that an appropriate case mix proxy for resource use can be derived from discharge diagnoses that have been weighted by age to create normative lengths of stay. Weights adjusted by geographic region created formulas for reimbursement.

Hospitals have been especially concerned by the inflexibility of the DRG system in making such Draconian provision for hospital reimbursement for outliers in the seriousness of illness continuum. This has been a very serious problem for those hospitals that historically have been a source of care for the elderly, the poor, and victims of trauma. ICU care is resource-intensive and very costly, and a hospital that is forced to dedicate a large proportion of its resources to ICU care is laboring under a serious handicap unless the reimbursement case-mix formula takes this into account.

A cogent challenge to the premises of the DRG system has been presented by Young (Young, Swinkola, and Zorn, 1982; Young, 1984) who has asserted that truly homogeneous case-mix categories can be created only by using both admitting and discharge diagnoses and a normative patient management plan. Interventions, she asserts, are as much a function of admission as they are of discharge diagnoses, and normative patient management plans are important as a means of minimizing inter-hospital differences in practice patterns, which have been documented by Chassin et al. (1986).

APACHE-Type Systems

Since these systems are based on admission and 24-32 hour ICU observations, they measure severity of illness and resource use with only these data. They are not helpful for long term ICU patients. Any use to modify DRG reimbursement would depend upon the tenuous assumption that there is a valid relationship between severity of illness as measured early in ICU care and appropriate resource use. At least one study has contradicted this assumption (Detsky et al., 1981).

TISS System

TISS scores reflect actual interventions and, hence, can be used by the hospital in support of claims for differential reimbursement. Payors, however, are likely to assert that observed resource use does not reflect seriousness of illness, unless one accepts the dubious assumption of a valid relationship between them. It would be of no use to payors in moves to limit prospective payment. Unbundling of services, possibly more difficult in the ICU than in the hospital as a whole, would even decrease the real value of this measure.

MPM System

In general, the same comments apply as for APACHE types. It is possible that the 24 hour and 48 hour models would be somewhat more effective in at least identifying cost outliers.

Summary:

None of these methods can be supported as a feasible and credible means of yielding a case mix profile that reflects admission and discharge diagnoses and appropriate patient management. All seem unlikely to be accepted, or even useful, to providers or payors in deriving an equitable basis for reimbursement for ICU services.

A2. Comparison of APS, SAPS, and MPM on a Common Cohort of ICU Patients

This section summarizes the results of the only direct comparison of APS, SAPS, and MPM on a common cohort of ICU patients. This research was part of a study funded by the National Center for Health Services Research. Results have been submitted for publication (Lemeshow et al.).

Between August 16, 1983 and January 10, 1985, 1,997 consecutive patients entering the general medical-surgical intensive care unit at Baystate Medical Center in Springfield, Massachusetts were studied. For each patient, data were collected to permit computation of the APS and

SAPS scores, and the $MPM_{0(OSF)}$ and $MPM_{0(CPR)}$ probabilities. Since TISS was designed for measuring resource use in the ICU rather than for prognostication based on underlying conditions, it was not included as part of this comparison. Midway through data collection activities, APACHE II was developed. In response, an additional data collection form was devised to acquire information necessary to compute the APACHE II score. This information was collected on the final 852 patients. It was not possible, however, to calculate probabilities of hospital mortality because reaching agreement on deciding whether a patient was immunosuppressed or selecting one primary diagnostic category was not possible. As a result, the performance of APACHE II was not compared to the other methods.

Figure 1 presents the cumulative distributions for probabilities of hospital mortality as determined by $MPM_{0(OSF)}$, APS, and SAPS. It is clear from this figure that the highest probabilities of mortality are produced with APS while the lowest probabilities are produced with SAPS. The $MPM_{0(OSF)}$ probabilities were typically between these other methods.

Table 25 presents this finding in a somewhat different way. As is seen in the top panel of this table, for the 1,601 patients who lived, the mean probabilities of mortality were comparable for $MPM_{0(OSF)}$ and APS, were lower with $MPM_{0(CPR)}$ and were lowest with SAPS. For the 396 patients who died, probabilities were highest using APS, followed by $MPM_{0(OSF)}$, $MPM_{0(CPR)}$, and SAPS. The difference in mean probabilities between the highest and lowest method for these nonsurvivors was sizeable, with APS yielding probabilities which averaged 13.5 percentage points higher than SAPS.

Also in Table 25 are the results of Friedman's two-way analysis of variance which assesses the difference among the methods by ranking the probabilities, from smallest to largest, for each patient. Two sets of comparisons were carried out - first comparing $MPM_{0(OSF)}$ to APS and SAPS and later comparing $MPM_{0(CPR)}$ to APS and SAPS for patients who ultimately lived and for patients who ultimately died. This partitioning of the methods was used since the two MPM models have six of their seven variables in common, and it was felt that a comparison to each other would not be valid. Results suggest that SAPS has significantly lower probabilities than either $MPM_{0(OSF)}$ or APS both for patients who lived as well as for patients who died. APS provided significantly higher probabilities of dying for patients who died.

All models did not fit the validation data set equally well based on goodness-of-fit tests for logistic regression models. Table 26 details these results for $MPM_{0(OSF)}$, APS and SAPS. (Results for $MPM_{0(CPR)}$ are similar to those for $MPM_{0(OSF)}$ and are not presented in this table.) It is clear from this table that for all methods, patients with the highest probabilities of dying tend to die while those with the lowest probabilities tend to survive. Comparison of observed numbers of patients who survive and die to the expected numbers using the $MPM_{0(OSF)}$ model suggests an extremely high level of fit using a goodness of fit test for logistic regression models (Hosmer and Lemeshow, 1980; Lemeshow and Hosmer, 1982). Of the 1,997 patients, 1,601 actually lived and 396 actually died. The model predicted 1,574 and 423, respectively. Comparisons within strata of observed to expected frequencies are, typically, very close. The same cannot be said for the other methods. For example, for APS, 469 patients were expected to die (i.e., the probability of mortality was greater than .50) when only 396 actually did. This complements the previous observation that the probabilities produced by the APS method on this cohort of patients were too high. Comparison of observed to expected frequencies within strata suggests again that the APS method typically underestimates the number of survivors and overestimates the number of patients who will die. For SAPS, the opposite observation may be made. Table 26 shows that the number of survivors is generally overestimated while the number who do not survive is generally underestimated. This, again, is not surprising since the probabilites of mortality with this method were lower than with the other methods. The p-values associated with APS and SAPS suggest that these probabilities do not accurately portray the mortality experience in this cohort of patients.

Table 27 compares the two MPM admission models to APS and SAPS with respect to sensitivity, specificity, predictive value for dying, predictive value for surviving, and total correct classification. Sensitivity ranged from 42 percent with SAPS to 57.1 percent with APS and specificity ranged from 93.7 percent with APS to 96.2 percent with SAPS. Results of the log linear analysis which was performed to compare the overall correct classification rates suggest no difference between $MPM_{0(OSF)}$ and APS. SAPS had significantly lower overall correct classification than these other two methods. $MPM_{0(CPR)}$ and SAPS had comparable overall correct classification, both somewhat lower than the other two methods. It is interesting that APS performed better in this cohort of patients than it did in a previously published validation where total correct classification was only 79 percent (Wagner, Knaus, and Draper, 1983a).

The previous observation concerning the APS method producing the highest probabilities and SAPS producing the lowest probabilities is reinforced in this table with respect to sensitivity and specificity. APS had the highest sensitivity and the lowest specificity of the four methods. This was expected, since it produced the highest probabilities.

A detailed analysis was performed comparing each MPM admission model to APS, first for patients who survived and then for patients who died. As is seen in Table 28, for patients who lived there is strong agreement between methods with respect to predictions, using a probability of .50 as the predictive cutpoint. That is, of the 1,601 patients who lived to hospital discharge, the two methods predicted the same outcome for 1,474 (92 percent) of them. There was disagreement on only 127 patients (8 percent) and of these, MPM correctly predicted that the patient would survive for 70 patients while APS predicted correctly for 57 patients. This difference is not significant as reflected in the McNemar's test. However, for the patients who ultimately died, there was considerably less agreement between the methods. Of the 396 patients who did not survive to hospital discharge, the two methods predicted the same outcome for only 241 (61 percent) of them. There was disagreement on 155 patients (39 percent) and of these, MPM correctly predicted the patient would die for 53 patients while APS predicted correctly for 102 patients. This difference is highly significant ($p<.001$) as reflected in the McNemar's test. Comparison of $MPM_{0(CPR)}$ to APS gives similar results with the exception that for the patients who lived, the MPM probabilities predicted correctly 60 percent of the time. This represents a significant difference ($p=.033$) in predictive efficacy of MPM as compared to APS probabilities for patients on whom there was a difference in prediction between the two methods.

Each of these methods, used alone, is effective in analyzing the case mix in a given ICU. Figure 2 demonstrates that for each method, as the score or probability increases, the percentage of patients who die increases. There is relatively little uncertainty as to outcome for patients with extreme probabilities.

In summary, this study demonstrated that all three methods provide a "reasonable" estimate of severity of illness early in the course of ICU stay. The small differences noted were that APS tended to overestimate mortality while SAPS tended to underestimate mortality. For this cohort of patients, MPM most accurately modeled the empirical mortality experience as based on goodness-of-fit tests. This finding is particularly impressive, because the MPM admission models are based on fewer variables, none of which depend on ICU treatment, and results are available at the time of ICU admission instead of up to 24 hours following ICU admission as is the case with the other methods.

B. Comparison of Other Patient Classification Approaches

Introduction

There are reports in the literature of many other patient classification systems, most of which are not directly relevant to ICU care. Some of these systems, however, deserve at least brief review because of their utility, the methodology used, or their historical contribution to patient classification systems. This brief discussion is far from comprehensive and makes no attempt to describe, or even list, all systems.

The systems selected for discussion fall into three categories: (i) those related to specific critical illnesses or organ systems, (ii) those that require invasive interventions, and (iii) a miscellaneous group, most of which have been proposed for hospital-wide use and for either patient and/or financial management. This analysis has been directed to a limited number of system characteristics including the purpose(s), method of derivation, characteristics of variables, and use related to the elderly for ICU decisionmaking. Details of the analysis are displayed in Table 29.

Systems for Specific Critical Illnesses: Burns, Coma, Trauma, Coronary Care

The Burn Index (Feller, Tholen, and Cornell, 1980) is one of the most successful attempts to develop a patient classification system that could predict patient outcome using data at or close to ICU admission. Empirical data from a national data base were analyzed and a clear association established between area/depth of burn and age, determined on admission, and patient survival. The Index has been improved as a predictor by adding inhalation damage as a patient variable and has become widely used in clinical decisionmaking at admission. It is especially valuable for very severely burned patients who may have a relatively (and deceptively) comfortable initial 24 hours. During this time they can confer with family and members of the treatment team and make a decision, based at least partly on a rational consideration of a very valid prediction of mortality, regarding the extent of treatment they wish to have. There are reports of patients who have elected not to be treated (Imbus and Zawacki, 1977).

In many ways this is an ideal model in that it has highly valid predictive value based on data that can be derived with reasonable objectivity on admission. Both its face and predictive validity have contributed to its wide acceptance by clinicians and patients. An additional use has been for comparing the efficacy of burn treatment over time, improvements noted especially for children, young adults, and the elderly. This reinforces the observation that a patient classification system built on variables that can be observed on admission and are not treatment-dependent can be a useful tool for assessment of treatment and/or physician practice patterns.

Another widely used classification is the Glasgow Coma Scale (GCS). This was developed to assist in predicting outcome for victims of head trauma, using data from both admission and later observation (Teasdale and Jennett, 1974). It is calculated from very basic patient data in a way that requires no additional personnel or effort. Attempts have been made to improve upon the basic model by adding more detailed neurological information, but the marginal gain in predictive power has not justified the extra effort and expense. Because of its face and predictive validity, it has been widely accepted as a useful tool both for making prognostic estimates for victims of head trauma and for neurological monitoring by ICU nurses (Levy et al., 1981 and 1985).

Neither the Burn Index nor the GCS has special relevance for the general medical-surgical ICU. Unless they decide upon nontreatment (and thereby use the ICU essentially as a hospice) severely burned patients are usually transferred to a burn center. In the ICU the GCS would be useful only for the small proportion of patients whose predominant problem is coma, of traumatic or other origin.

A number of systems have been proposed for use for patients with severe/multiple trauma, among them the Trauma Score (TS) [Champion et al., 1981] and Injury Severity Score (ISS) [Baker et al., 1974; Champion et al., 1980b] the Trauma Severity Index (TSI) [Gustafson et al, 1983], and the

Revised Estimated Survival Probability Index (RESP) [Levy, Goldberg, and Rothrock, 1982; Goldberg et al., 1982]. Most have been derived from data gathered either in the field (TSI) or on admission (TS, ISS), using panels of experts. Their purpose has varied from prediction of outcome (TS, ISS) to evaluation of EMS programs (TSI).

In general, trauma-related scales have only limited relevance to ICU decisionmaking for the elderly for two reasons. First, only a relatively small proportion of ICU patients are trauma victims. This proportion may be larger in some urban hospitals, unless there is a separate trauma care unit. Second, trauma is concentrated in the younger age groups; it is the leading cause of death at age 16-25. As can be seen from the details of Table 29, these systems have been used both as predictors of outcome and for program evaluation. None has received the general acceptance of the Burn Index and the GCS.

Another set of illness- or site-specific systems is the group that has been developed to assess patients with severe cardio-respiratory problems, especially coronary artery disease. They have been developed to assist in admission decisions, to predict the outcome of myocardial infarction, to predict cardiac complication prior to noncardiac surgery, etc. Most of these have been derived by using some statistical modeling strategy based on data gathered prior to, at, or subsequent to admission. Examples of these systems are the Complication Impact Index (Civetta, 1980), the Coronary Prognostic Index (Norris, Brandt, and Caughey, 1969), and the Multifactorial Index of Cardiac Risk (Goldman et al., 1977).

One of the interesting, well-validated, and most promising approaches is that of Pozen et al. (1984) who developed the Coronary Intensive Care Function (CICF). Using statistical modeling the authors developed a system based on nine emergency room observations, including EKG. A multi-hospital validation demonstrated a significant reduction of false positive MI admission decisions with no significant increase in false negatives when admitting physicians had access to the CICF results. While using this system CCU admissions dropped off by 30 percent. This seems to be an example of a system that uses preadmission data to aid decisionmaking with positive results for patient care and CCU cost. No other reports of its use in practice have been located.

Although some of these systems have been carefully developed and well validated, none has received acceptance and use by clinicians comparable to that accorded the systems for burns and coma. Some of them deserve careful analysis for their use of statistical analyses for model derivation.

Invasive Approaches

Afifi et al. utilized discriminant function analysis to reduce the number of variables needed to predict mortality in patients with drug overdose (1971) and myocardial infarction complicated by shock (1974). These studies are further examples of the use of multivariate techniques for objectively determining important hemodynamic variables.

Bland and Shoemaker (1983) and Shoemaker (1982) have developed the Global Predictive Index which utilizes hemodynamic profile information combined with derived metabolic parameters to predict mortality in patients with circulatory failure. This approach may have clinical application for patients with preoperative Swan-Ganz monitoring. These studies have presented valuable data regarding the treatment of "stressed" patients by providing "stress" cardiac performance results rather than maintaining or accepting normal values.

In conclusion, even though hemodynamic measurements offer sophisticated evaluations of patients' circulatory status and may be useful for individual clinical decisionmaking, they would be applicable for only selected patients.

General Systems

In addition to systems developed for classifying patients with trauma and other specific illnesses there is a large number that have been developed for general use and with no disease, procedure, or setting as a focus. Most have arisen in response to a need for evaluation of care or for management of resources. Only a few of a very large number can be mentioned here.

Diagnosis Related Groups (DRGs)

This is the best known and the most widely adopted of these systems. It was developed originally as a means of analyzing hospital case mix for utilization review (Fetter et al., 1980). Accurate and easily derived case mix information was expected to be an essential component of Medicare-mandated utilization review. As concern increased for escalating health care cost the DRG system was explored as a means of standardizing reimbursement for hospitals. It was adopted for calculating hospital reimbursement for services to Medicare recipients, and became the first widely adopted prospective payment plan by service (excluding capitation-based prepayment plans). There is widespread speculation that this or some related type of system will be adopted by insurance carriers.

The DRG system used panels of experts to classify all diseases and procedures, excluding psychiatric and pediatric conditions, into one of 467 diagnostic groups. The assumption was that each of these represented a group of conditions sufficiently homogeneous to be evaluated by a common normative standard. When adopted for reimbursement purposes each DRG is assigned a weight calculated to reflect the intensity of resource use for that set of conditions. Weights are adjusted for age and geographic wage scales.

The resulting adjusted weight is then multiplied by a unit dollar figure to calculate the reimbursement for each hospital. Adjustments for outliers at the high end of the hospital charge scale requires a hospital first to absorb completely a substantial loss before getting partial reimbursement for prolonged patient stays.

A large number of concerns have surfaced. Foremost among hospital administrators is the conviction that more will be lost from uncompensated care for high outliers than will be recouped for outliers at the low end of the continuum. Related to this is a challenge to the assumption that the present 467 categories, based primarily on discharge diagnoses and procedures, constitutes groups that are sufficiently homogeneous to be the basis for a fixed reimbursement. Young (1984) has pointed out that homogeneous groups can be created only by considering not only discharge diagnoses and procedures but also admission diagnosis and the patient management plan. Furthermore, ICU patients in general are a class apart from others, characterized by wide variations in length of stay (often depending on survival) and intensity of care that is substantially above the mean for the hospital.

Patient advocates, on the other hand, are concerned that access to appropriate care may be made more difficult, be limited, or even be denied to those in greatest need, the poor and the elderly - both of whom tend to need more care.

These are but two of many related and apparently legitimate concerns about DRGs.

Comparing DRGs with other general systems, one can observe that they are of no value for clinical decisionmaking (unless used to seek early transfer of patients who are anticipated to be high outliers). They obviously have no predictive value, and they are inadequate as a means of reflecting either seriousness of illness or resource use for ICU patients. Systematic underpayment for ICU care may lead hospitals in the short run to limit ICU admissions and in the long run to decrease the number of ICU beds (Coulton et al., 1985).

Generalized Patient Management Paths

This is a strategy designed to define groups of patients that are more homogeneous with respect to resource use, to meet some of the reimbursement objections to DRGs and, thereby, to provide a vehicle for reimbursement that is equitable to both providers and payors. Fifty disease-specific panels of experts defined 800 patient management categories (PMCs), patient management paths for each of these categories, and relative cost weights for each PMC to reflect the cost of services specified in the patient management path. In defining PMCs discharge diagnostic data are used so that comorbid conditions are identified without reference to the primary-secondary diagnostic hierarchy. A patient may be assigned up to five PMCs.

For each PMC physician panels specified appropriate hospital services, diagnostic and therapeutic, for effective management of the condition. These were then used to derive a set of weights to reflect the relative cost of appropriate services. Relative cost weights were determined by analysis of cost (not charges) in six hospitals, teaching and nonteaching, using ledger data from each. Costs were then tracked to generate unit service costs.

This system has no use for clinical decisionmaking, except insofar as diagnosis-specific patient management paths are available to attending physicians as recommended guides for treatment. Its primary use seems to be as a standard for hospital reimbursement that is more sensitive and responsive than DRGs to the wide variations in resource use that occur within disease groups or categories. In addition, the management protocols could be useful for intro-hospital utilization review and physician education.

Generic Algorithms

This is a system designed to classify patients in groups that may be useful for reimbursement purposes and possibly for quality assessment. The authors (Bertram et al., 1982) propose to subdivide a primary diagnosis group (e.g., liver disease) according to characteristics of secondary diagnoses, if any; mortality, using PAS mortality rates; chronic disease; LOS; or invasiveness of procedures. Single algorithms can be combined to create a hierarchy of patient problems ranked by severity, a crude case mix estimate. Using empirical data from six hospitals, the authors found increasing hospital cost, as measured by charges, associated with increasing severity.

From the information available it appears that this system will have no use in clinical decisionmaking for the elderly, since age is not a factor and all information is derived from the discharge abstract.

MEDICUS

One component of the MEDICUS system has been designed as a process model to monitor the quality of nursing care; another has been developed for managing nursing resources. This system is but one of many systems that share one or both of these goals related to nursing services.

In both cases a panel of experts has defined criteria relevant to the goal. For quality assessment 222 criteria were developed. Of these, 30 to 50 are drawn from a computer file for each patient or unit setting. For the management study, each nursing shift gives a binary response to 37 criteria, on the basis of which patients are grouped for intensity of nursing needs. Nursing process and nursing needs are derived from the data.

These systems have no practical use for ICU care, except for documenting the need for nursing. They can make no contribution to clinical decisionmaking for the elderly.

MEDISGRPS

This system has been developed to document case mix for purposes of reimbursement. Data are recorded early in hospitalization to classify patients in one of four severity levels that range from minimal function derangement to organ system failure, with the assumption that severity of illness is a proxy for resource use. Age is not a factor. It is not clear that this system, although used in several hospitals, has any value for ICU decisionmaking for the elderly. All values are subjective clinical judgements. No reports of validation have been located.

Severity of Illness Index

This is a system designed to define and explain case mix variation within DRGs and other diagnostic categories (Horn and Sharkey, 1983). The Index has been generated by a panel of experts as a generic (not disease specific) four-level index calculated from seven variables related to patient illness, selected because of their relation to patient characteristics and burden of illness. Data are gathered from the discharge record.

It is a relatively complicated process. Age is not a variable; the Index seems to have no use for decisionmaking in the ICU.

Staging of Disease

This system has been devised to measure the severity of illness for specific well defined diseases (Gonella, Hornbrook, and Louis, 1984). Panels of experts have classified each of 420 diagnoses on a 1-4 scale, according to clinical characteristics: location, manifestations, cause, and severity. The system uses the local-regional-systemic characteristics in much the same manner as the familiar cancer staging process. Age is not a variable. It is difficult to anticipate any practical use for clinical decisionmaking in the ICU. The system could be useful in clinical trials for comparing effectiveness of alternative treatments and for reimbursement analysis. Comparing stages between diagnoses would be difficult, since some disease categories are not rated at all four levels.

Section 4: Rationing: Economics, the Law, and Ethical Concerns

Introduction

In any advanced industrial society there is an inherent close and interdependent relationship between the economic and regulatory practices that have been adopted to deal with a universal scarcity of resources, existing legal canons, and predominant ethical principles. Although discussed serially in this section, each can be understood only in relationship to the others. Considered together, they form the cultural context in which clinical decisions are made for care of the elderly.

A. Economic Aspects

In the minds of many U.S. citizens, especially those elderly who experienced the shortage of civilian goods and services during World War II, rationing is viewed as a harsh externally imposed set of regulations through which the government attempted by legal means to distribute resources that were in short supply. The obnoxious features of this rationing effort were blunted somewhat by a commonly shared perception that shortage of gasoline, some foods, and many other goods critical for the war effort was a temporary phenomenon. Rationing was seen, therefore, as a short term constraint upon the market system, a constraint that could be justified legally and ethically in an emergency but that would be removed as soon as resources were more readily available for general consumption. Thus, the image of rationing was cast in a profile of its most severe expression. It was widely accepted because it was both anomalous and temporary; its acceptance as a long range strategy would have been resisted much more strenuously.

In a more generic sense, however, rationing is a process that is not confined to emergencies. A basic premise of economic and social life, whether capitalist or collectivist, is that there is some degree of scarcity associated with all goods and services. Although the limits of natural resources may not have been fully explored or exploited and certainly the ultimate level of human skills and potential has not been reached, at each particular time and circumstance there is a limit to the goods and services that will be produced. At all times there will be fewer goods and services produced than would be used if they could be distributed without cost to consumers. In all circumstances, therefore, there must be a system of rationing that defines the social rules governing allocation and distribution of goods and services available at the time. Essentially, rationing in its generic sense is a method for apportioning goods or services that are not unlimited (Mechanic, 1985). Although the methods may vary from time to time and from place to place, the need is universal and the basic process inescapable.

Rationing takes place not only at the level of distribution (micro allocation) but also at the level of resource allocation (macro allocation). At the national level a decision has to be made regarding the resources that are to be allocated for agricultural suppport, national defense, health, social security, and many other programs. At the local level a decision may have to be made between support for a well-baby clinic and a health awareness program for the elderly, between a housing inspection program for lead paint and an augmented emergency medical system for coronary disease victims. There is no way of escaping allocative rationing decisions at either national, state, or local level.

Rationing has been described in three forms in western social systems: by the use of price (cost sharing) or by either implicit or explicit rationing strategies. Although they are described as conceptually distinct, most regulatory practices contain some elements of more than one. In the market system as described by Adam Smith rationing occurs in the free market of buyers and sellers who use price as the vehicle for relating values. In the idealized form of this system bread, clothing, automobiles, and travel are all exchanged between buyer and seller only when the price is right for both. In theory, therefore, all goods and services are of comparable social value and no buyer or seller can demand exchange in the absence of agreement on price. There are, in effect, no inherent rights or claims of buyers or consumers to any commodity for which payment cannot be made. (The ethical dimensions of this assumption are discussed later.)

Despite the current strident assertions by some policy makers that the market is an effective and appropriate mechanism for apportioning goods and services, it seems very unrealistic to expect that the market of Adam Smith can assure a socially acceptable distribution of all items of exchange. There is considerable, if not universal, agreement that some goods and services are so essential either to individual survival or to social progress that at least a minimal level must be available to all, regardless of ability to pay. Public education and publicly supported aid for unemployed mothers are but two examples. The chief remaining disagreement is over the level and the conditions, not the principle, of support.

For many reasons, health care is another service that does not meet the criteria for acceptable distribution via the free market.* Some level of health care may be necessary for the survival and/or well being of a majority of the population and appropriate care of individuals may redound to the benefit of the larger community. Unlimited health care, however, has never been accessible to everyone. In effect it has been rationed, informally but none the less effectively, by price. The price may have been financial, distance, overcoming cultural barriers, and many others - each a price to be paid in exchange for care. When the burden of those unable to meet price expectations has become too high, politically or socially, publicly supported measures have been adopted as subsidies. Medicaid and Medicare are examples of social programs that attempted to readjust the inacceptable disparity in access to care on the part of the poor and the elderly within the existing predominantly market-oriented health care system. Although they reflect other rationing principles in addition, these programs adopted cost sharing by patients as a means of having poor and elderly buyers of health care feel some direct impact of the market price of care. With the current increased economic and political acceptance of the market as the preferred vehicle for apportioning goods and services, it should be no surprise that greater reliance is being placed upon cost sharing by patients - rationing by price - as a major strategy for cost containment.

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* This may be true of most goods and services in a complex modern industrial or post-industrial society, but a detailed discussion of this topic is outside the scope of this report.

Cost sharing anticipates that those receiving services will bear directly at least a substantial portion of the cost of these services. This strategy is based on the assumption that having to bear some of the cost of services will make consumers more prudent in the use of services than they would be if no cost were attached. There are at least two related problems with this approach.

a. There is no reason to expect a positive association between need for care and ability to pay. Indeed, there is considerable evidence of a negative association; the poor have been demonstrated repeatedly to have greater health care needs than the non-poor. Furthermore, there is substantial evidence of minimal price elasticity for the most essential medical services. Since poverty increases with age and a large proportion of the elderly will at some time have a health crisis for which ICU care may be necessary, or at least considered seriously, any cost sharing demands will have a disproportionately negative impact upon those with the greatest need, among them many of the elderly. Cost sharing is, therefore, an especially inappropriate means for rationing care when applied to the elderly or the poor. Neither anxious acutely ill elderly patients nor their families can be expected to make rational price-sensitive decisions regarding possible life-saving interventions.

b. Health care, like education, can be viewed as a universal need that has both individual and social utility. Despite sound evidence that there are sometimes serious adverse consequences from the best health care - and obviously more serious outcomes from inept care - there is little possibility that health care will be devalued seriously. It will continue to be viewed as a necessity that almost everyone may require at some time in life. Furthermore, there are benefits from some individual services that accrue to the larger community or society, as in the case of some immunization programs.

Implicit rationing anticipates that socially and politically acceptable decisions can be made about the total amount of resources that can be allocated to health care. Provider decisions can then be made based upon the known resource limits. Thus an HMO, knowing (or assuming) its practical premium limits, can devise a package of benefits by setting bounds on the types of care: medical, surgical, psychiatric, dental, physical therapy, etc. It is important to note that these allocative or production decisions are made prior to the presentation of individuals with specific needs.

This strategy meets the criteria for distributive justice* much more clearly than does cost sharing. Limits are placed in advance on the services available. Some services may be excluded, but their inclusion or exclusion is decided by category, not by the qualities of individuals (e.g., not by the level of poverty or affluence, race, gender, etc.). Decisions regarding included or excluded services become largely a function of providers, ideally responsive to consumer preferences.

Explicit rationing involves more direct control over allocative decisions (Mechanic, 1985). Administrators, rather than physicians or other direct care providers, become the primary agents for decisionmaking - one hopes with the guidance and/or concurrence of the care providers and consumers. Emphasis is upon specific strategies designed to allocate resources in a way that is just and economical: second opinions prior to selected elective surgery, awarding benefits to classes of people (such as dental services to pre-school children), excluding classes of people from benefits (no admission to renal dialysis after age 80), etc. Physicians are spared the difficult individual decisions regarding patient services; the trade-off is that they have less control over some of the limits of clinical care.

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* See discussion of this on page 122.

Theoretically, asking individual physicians to ration services to individual patients contravenes the widely excepted principle that it is the physician's responsibility to recommend care for each patient without regard for the social impact of generalizing this practice to the entire population. In fact, however, it is becoming increasingly difficult for physicians to honor this principle in all situations, especially with the rapid development of resource-intensive interventions and a steady increase in the elderly population who may become candidates for these interventions. Furthermore, the dilemma of physicians is only increased by the subset of the acutely ill elderly who wish not to have these interventions used.

As new capability develops for intervening in severe acute illness, as there continues to be a substantial increase in the elderly population for whom intervention may be appropriate, and as the pressure continues for containing the cost of health care, it seems inevitable that more attention will be directed to adopting strategies for rationing that are economically feasible, legally possible, and ethically acceptable. Prospective reimbursement will increase these pressures, especially if it is extended from Medicare recipients to other patients. All sectors of the health care industry can be expected to seek ways to limit service costs in order to stay within projected income limits. One crucial ingredient for the difficult decisionmaking will be an objective means of measuring the efficacy, the marginal outcome benefits, and the opportunity costs of ICU interventions. Predicting treatment outcomes for different age strata will be very helpful as one factor in both individual clinical decisionmaking and proposing strategies for the allocation of beds to ICU.

B. Legal Issues

Legal and ethical issues are closely related. Both are difficult to disentangle from cultural values; both are closely related to economic and political realities. In the context of this project, with its emphasis on ICU care for the elderly, among the predominant legal questions are the following:

1. What legal problems arise when it is proposed to withhold extraordinary care (e.g., honor a DNR order)? This is a recently established practice and no coherent policy is

evident as a result of court decisions to date. A Massachusetts court affirmed that a DNR order for a patient in the terminal stages of an unremitting incurable illness is appropriate, assuming the knowledge and consent of the patient, or the family in the case of an incompetent patient (President's Commission, 1983). Despite this ruling, however, some physicians and hospitals are uncertain about their liability for (a) carrying out or (b) not carrying out DNR orders by patient or family. Their uncertainty is augmented by fear of malpractice suits, undesirable media attention, and the pressure of religious or other groups that may support extreme positions. Several state medical societies (Alabama, California, New York, Minnesota) have developed statements in support of this practice that specify the conditions under which it should be carried out.

2. What legal problems might arise if a decision were made to withhold usual, although possibly extensive and highly invasive, treatment in the event of substantial evidence of overwhelming probability of death? Clearly this could be done only with the informed consent of a competent patient, the responsible family member, or a legally appropriate surrogate.. For example, a 78 year old patient who is totally incapacitated with Alzheimer's disease (disoriented, incontinent, unable to perform activities of daily living) develops pneumonia and the medical consultant recommends intubation and positive pressure respiratory assistance. It appears that in the absence of informed

consent by the family to withhold treatment (or by the court in the absence of family) the recommended intervention should be carried out.

3. What legal problems would arise if a hospital, concerned with cost escalation, resource allocation, and cost effectiveness, were to establish a regulation that would prohibit admission to the ICU (or would admit for only pain relief) patients above a specific age or who by an objective predictive measurement had an overwhelming probability of dying? Although this might be justified from an ethical perspective or from a concern for rational and productive allocation of scarce resources, it seems that the risk of malpractice makes this an unlikely option in the near future.

4. Can a state or national legislative body establish age as a criterion for admission to a benefit program? Renal dialysis is a case in point. Based on resource allocation and equity concerns, regulations of the United Kingdom National Health System in effect set an age limit after which renal dialysis can be instituted only by exception. Clearly individuals cannot be excluded from intensive care, but might it be possible to exclude classes of people? It seems likely that this would be viewed as a forbidden discriminatory practice. It will be discussed in more detail as an ethical issue.

C. Ethical Issues

There is a strong presumption in Anglo-American law that every person has substantial prerogatives for self-determination, subject to compelling social interests. The balance between individual and social interests has swung widely from time to time, as libertarian and egalitarian inclinations have predominated. Overall, however, there may be no other Western culture in which the rights of individuals have been asserted with more vigor and persistence than in the United States. Self-determination, the consistent expression of individualism, has been neither absolute nor pre-emptive of other principles of social relationship. However, whether viewed as self-determination of will, as defined by Kant, or of action, as defined by Mill, it has been a firm cornerstone of all Western philosophical structures. It is the embodiment of the ethical principle of autonomy, which is at the center of practical concerns for clinical decisionmaking in the ICU, especially in the case of the elderly.

Patient autonomy in the ICU is concerned primarily with the problem of informed consent for diagnostic procedures and/or treatment. This may be especially true for the elderly who, through a combination of aging and serious illness, may have limited sensory or cognitive ability (Stanley, 1983; Stanley et al., 1984). Informed consent has often been justified not only as a protection of autonomy but also as a means of protecting ill-informed persons from harm, and on the basis of social utility. The presumption has been that everyone, patients, providers, and institutions for care and research, will be served best by the protection inherent in consent (Beauchamp and Childress, 1983). Among autonomy, protection from harm, and utility, concerns for autonomy seem most compelling; patients seem to have rights to information and an opportunity for consent even when principles of social utility and protection from harm may not be served.

Informed consent is based upon elements of information and action. To meet essential conditions of consent, information must be both complete and comprehensible. The extent of "complete" information may be arguable, but the intent should be clear: to give the patient, and family, full disclosure of the extent of illness; the options, advantages, and risks for diagnostic and therapeutic procedures; and prognosis. This information should distinguish between the levels of uncertainty that are attached to benefits, risks, and prognosis. It is especially important that the information be relayed in a means and in language that makes it comprehensible to patient and family (Stanley, 1983; Stanley et al., 1984).

Under optimal circumstances the action of granting consent must be fully voluntary, with no coercion that suggests the extent of consent will influence the relationship between the patient and health care provider or institution. It is a matter of special importance that the patient is competent to understand the information and its implications and able to make a rational decision regarding diagnostic procedures and treatment.

Assessment of competence is especially important in many biomedical situations where the effects of illness or injury may render a patient at least temporarily incapable of evaluating information and making a rational decision. In addition many elderly, especially the older elderly, may suffer from a sensory, cognitive, or emotional deficit that makes comprehension and decisionmaking impossible, or at best problematic. In these situations there will have to be reliance on close family members, who may have to act with or without historical information about the patient's inclinations, as might have been expressed in a living will. In all evaluations of patient status it is well to recall that competence, or incompetence, may be categorical; for example, a patient may be incompetent to manage financial affairs but competent to make health care decisions, or vice versa. In the case of presumed incompetence there have been differing legal directives regarding the appropriate locus for decisionmaking: the court, a legally appointed guardian, institutional ethics/prognosis committee, etc.

It should be noted that this concept of consent based on autonomy makes no provision for professional decisions to withhold information or give misleading information. Evasion or deception is generally viewed as denying the respect for persons that is an essential attribute of autonomy as a guiding ethical principle. Likewise, full information requires complete candor regarding involvement in research protocols or the use of experimental modes of diagnosis or treatment.

Frequently, because of the seriousness of illness or injury, the ICU patient may not be in a position to give informed consent, but this does not absolve the hospital and its agents of the responsibility for making a good-faith effort to seek consent as soon as genuine emergency needs have been met. If the patient remains incompetent, consent should be sought from the family or a proxy who can represent him/her in decisionmaking. As the elderly population increases, it becomes increasingly important that there be a legally sanctioned means for potential patients to anticipate their disability by executing a living will and/or granting a durable power of attorney.

Finally, although gaining consent may seem to be a superfluous and time-consuming exercise - and, indeed, sometimes impossible - it should be recognized as an essential element of trust, an indispensable component of the social fabric. Education of the public regarding the importance of consent as an expression of autonomy is an important professional responsibility.

Primum non nocere (first, do no harm), the traditional primary ethical imperative for physicians, outlines a second basic ethical principle, nonmaleficence - and its counterpart beneficence. Intuitively, this seems to be a relatively direct and noncontroversial standard for human relations, a guide for actions that would reinforce trust by minimizing harm or injury.

In the context of the ICU, however, putting the principle into practice raises important questions. Is there a definable difference among intending, causing, or permitting death (Beauchamp and Childress, 1983)? Is harm caused or avoided by strenuous efforts to prolong existence for a patient who by all criteria and experience has virtually no probability for survival? For whom is a concern for harm paramount when evaluating continuing care: the patient, whose existence, comfort, and quality of life are at stake; the family, who may want "everything done" (but who do not have to endure the resulting discomfort); or the ICU staff, who may have ambivalent feelings about their responsibility to the patient, the family, and the health care community?

Substantial social ferment has arisen in recent years regarding application of this principle. Advances in technology have made it possible to treat successfully many conditions previously viewed as hopeless. Pushed to the extremes of application, however, these technologies have often prolonged a hopeless, meaningless, and uncomfortable existence. From this ferment there seems to be arising a well articulated and ethically sound questioning of what constitutes harm and the circumstances under which it is ethically acceptable, if not mandated, to discontinue treatment (President's Commission, 1983).

The third principle to be considered is that of distributive justice. This becomes a problem only under conditions of scarcity and competition (Beauchamp and Childress, 1983). The practical concern is for devising a basis for apportioning limited resources that meets requirements for equity and fairness. Some of the criteria suggested and actually used have been:

- to each equal shares
- to each according to need
- to each according to effort
- to each according to social contribution (past or potential)
- to each according to merit
- by lottery

Clearly, these represent considerably different views of appropriate applications of an intuitively accepted principle: justice requires distribution that is equitable and fair. It is not appropriate to discuss these criteria in detail beyond noting that, although most of them reflect individual concerns, at least one, social contribution, reflects aggregate rather than individual benefits. This defines one of the most urgent questions relative to distributive justice. To what extent should allocative and distributive decisions reflect projected benefits to a small, and perhaps select, cohort of patients vs. benefits to a much larger cohort? To be specific, what does the principle of justice direct if a decision has to be made between investment in a hot breakfast program for a disadvantaged school population and investment of a comparable amount in expanding ICU beds.

In specific situations there is often conflict among these principles, a conflict that may be partially resolved according to the ethical framework that is accepted. Thus a consequentialist resolves questions in terms of net benefits and harms; in this calculus social benefits may outweigh individual losses. Others emphasize intent or duties; for them individual autonomy may predominate. In short, despite widespread agreement on the validity of these ethical principles when viewed separately, there is no unanimity regarding a consistent hieraracby of principles to guide decisionmaking when they are in conflict.

The practical implication for this review is that substantial questions may, and should, arise regarding non-treatment in the ICU. They must be decided in terms of (i) the ethical principles and system upon which decisions are based, (ii) the criteria for decisionmaking (not to treat); and (iii) the appropriate mechanism for decisionmaking (Black, 1985). The first, ethical principles and systems, has been outlined. These require that decisions consider autonomy, nonmaleficence, and justice within some systematic or conceptual framework.

The President's Commission (1982 and 1983) has discussed the criteria for nontreatment in terms of both ethical concerns and practical applications. Their conclusion is that all three principles can be called upon to support nontreatment decisions, provided there are a set of criteria and an appropriate process. All such decisions, however, reflect a reversal of the traditional ethical preoccupation with maximal care for the individual, in favor of broader social interests.

Wider acceptance of the Commission's leadership in expanding the realm of social ethics will call for increasing emphasis upon establishing criteria and process.

Criteria should include the best predictive information available regarding ICU survival and return to function. These dimensions of ICU care deserve additional study in order to have statistics that are widely recognized as reliable and valid.

The process for decisionmaking for the incompetent patient has been discussed by the Commission (President's Commission, 1983). Under ideal circumstances the patient will have anticipated this contingency by executing a living will or a durable power of attorney. If this has not occurred, a proxy or surrogate may be called upon: the family or a court-appointed patient advocate. A hospital ethics or prognosis committee may be a useful agent in decisionmaking. Finally, the court itself may have to decide.

It is important that this set of issues get wide and thoughtful public discussion and that whenever possible an appropriate legal framework is established that will allow full exercise of autonomy, nonmaleficence and justice in ICU decisionmaking. In the long run the ethical framework within which decisions are made will be as important as the clinical aspects of decisionmaking.

Implications for the Elderly

General Principles

Providing available, accessible, affordable, acceptable, and accountable care for the elderly - as with any other population - depends upon clarifying the chief determinants of the need for services. These are discussed here in terms of (i) the profile of the population to be served, (ii) the projected needs of the population, (iii) use of services, and (iv) social values. Although discussed sequentially, these are, in fact, intersecting and inter-related variables.

Population to be Served

There have been numerous population projections, each depending upon a current data base plus assumptions about the direction and intensity of changes in several variables. Each, therefore, should be viewed as a combination of observation and assumptions that are essential for planning but that are subject to both subsequent verification or modification on the basis of later observations and change of assumptions. This discussion is based heavily on the analysis by Rice and Feldman (1983) using Social Security Administration statistics. The observations would differ only slightly if the discussion had been based on statistics from the WHO or the U.S. Bureau of the Census.*

Population projections are usually developed from estimates of mortality, fertility, and net immigration. Of these, mortality rates are the most important, as well as the most problematic. In general it is safe to assume that in the near future there will be an important increase in both the number and the proportion of elderly (65 years and older) in this country, continuing a trend from the recent past. This will be especially true of the very elderly (85 years and older). Thus, while the number of elderly increased by 55 percent (from 16.5 to 25.9 million) between 1960 and 1980, the population under 65 increased by only 24 percent during the same period. Even more striking was the increase of those 74-85 by 65 percent and those 85 and older by 174 percent. As a proportion of the total population the elderly increased from 9.1 to 11.1 percent during this 20 year period.

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* Figures from the latter source tend to be lower because of presumed under-reporting of the U.S. populations plus non-inclusion of residents of Puerto Rico, the Virgin Islands, American Samoa, Guam, and Federal overseas employees and their dependents. For the purpose of this discussion, the differences are not relevant.

Since the need for health care increases with age, this dramatic increase in the older population has important implications for health planning. Thus, in 1978 the elderly comprised 10.9 percent of the population but used 29.4 percent of the health care dollar. Specifically, those 65 and older used $2,026 per capita for health care; those 19-64 used $764, and those under 19 used $286 per capita. If, as projected, the elderly population increases by 41 percent from 1980 to 2040 and those 75 and older increase from 4 to 11 percent of the population, it seems almost inevitable that there will be a very substantial increase in the nation's health care needs.

The actual rate at which the elderly population increases will vary largely as a function of the mortality rate. Since 1960 there has been a sharp and incompletely understood drop in the mortality from cardiovascular disease and stroke. At present there is no certain means for projecting the rate or duration of this drop in the future. It is widely presumed that it will continue unchanged, at least for the near future, leading to a very substantial increase in the elderly. Eventually, this curve must flatten somewhat, but at present there is no consensus regarding when this will happen. Furthermore, a breakthrough in the prevention or treatment of cancer or other chronic diseases will only accentuate the trend to an older population profile.

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Fertility, the second factor in determining population size, is of no importance in determining the number of elderly for the next 65 years, at least. Those who will reach 65 in 2050 have already been born. It could influence the population profile, however, thereby altering the "productive" segment of the population who may be called up to support the economically more dependent elderly.

Immigration, the third factor, has been assumed to continue at about 400,000 per year. It seems unlikely that this will change to an extent that alters these population projections.

Use of Health Care Services

The intuitive conventional wisdom is that there is a pronounced and unavoidable increase in morbidity and disability among the elderly that will lead to an increased dependence on health care. Using a model of health changes as in Figure 3 (adapted from Manton and Soldo, 1985), Fries (1980, 1985) has argued that as the morbidity, disability, and mortality curves move to the right they will become "rectangularized". If, as he suggests, the curves for disability and morbidity move more rapidly than the curve for mortality (as indeed they must eventually as the mortality curve approaches its vertical limit), the area of B plus C will decrease. When this occurs, there should be a decrease in the time the population is in need of medical care. If this is true and if one assumes no increase in the mean severity of illness, there could be a decrease in the aggregate need for care of chronic illness. Ideally, a large proportion of the population would live out the natural span of life (which he suggests is 85 ± 15 years) and then die of organ depletion.

Using the same model to investigate morbidity, disability, and mortality but drawing inferences from life table analysis, others have drawn somewhat different conclusions (Manton, 1982; Manton and Soldo, 1985; Soldo and Manton, 1985). They agree that mortality will continue to decrease but cite empirical evidence that the length of age-specific morbidity has not decreased as mortality decreased. They suggest that postponing death may only postpone the period of intensive need for health care until a later age, when physical, emotional, and social resources will be more thinly stretched and illness may be more disabling.

Several points are worth noting in summary. First, all projections of population profiles point to a marked increase in both the number and proportion of the elderly in the future. Estimates differ only in the rate of increase projected; the differences are small. Second, any risk factor intervention, such as change in lifestyle or control of environmental hazards, that is effective in primary prevention is likely to be adopted only gradually. Its influence on morbidity will be delayed for many years; it will not, therefore, have a substantial effect on the chronic or acute disease burden in the near future. Third, regardless of the age at which morbidity begins, there remains a high probability of at least one episode of acute illness, with an accompanying probability of need for intensive care. It has been suggested, for example, that a common pattern of health care use may be acute care (requiring ICU care), rehabilitation, convalescent care, and a return to acute care, as organ systems fail (Manton and Soldo, 1985).

It seems likely, therefore, that in the forseeable future there will be a substantial increase in the need for health care for the elderly; at least some of it will be for the intensive care of critical illness.

A second factor contributing to the increased use of health care has been a continuous development of technology, both diagnostic and therapeutic. The phenomenon is so apparent and the examples are so numerous that no elaboration is needed. Two points are worth mentioning. First, advanced technology has tended generally to be more intensive, more costly, and often more invasive*. Secondly, the technological imperative tends to lead to rapid adoption of initially promising interventions, often before they have been evaluated thoroughly for indications, efficacy, long term benefits, adverse effects, or cost. There is little reason to believe that this trend will be altered easily in the near future. The implication for intensive care for the elderly is that additional technologies will be introduced, with minimal marginal benefits in terms of either length or quality of life, and with a high probability of increasing the cost of care.

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*There are exceptions to the trend. The supplanting of some coronary bypass surgery with coronary angioplasty and computerized tomography (CAT) are recent examples. The extent of this counter-trend is uncertain.

Availability, access, and cost of care are an additional set of factors that influence use of services. In contrast to technology, availability and access are socially-controlled factors, ultimately determined in the political arena. The total cost of health care is driven by technology, social expectations, provider-determined demand for care, reimbursement patterns, and other economic factors; the distribution of costs is a political decision.

Social and economic conditions influence the use of services. Some services, such as care for emergencies and other life-threatening problems show little variation with income; other services, especially those directed to disease prevention, show a much closer inverse relationship to income. In both cases third party reimbursement, whether from public or private sources, is considered as income for health care. Clearly, in "good" economic times and when there are equitable publicly supported health care programs for the poor, more health care services will be sought. There is abundant documentation of this in the period following the introduction of Medicare and Medicaid (Davis and Schoen, 1978). On the other hand, withdrawal of public support for health care can be expected to decrease use, with uncertain long-term effects. The need for later intensive care may be increased if/when more serious health problems supervene.

Expectations of consumers have a definite effect on use of services. Public information about Pap smears, coronary bypass surgery, magnetic resonance imaging (MRI), and myriad other technologies has increased awareness of these interventions on the part of not only providers but also consumers, with a resulting rapid increase in use.

Finally there are fluctuations or changes in social values and concerns, especially on the part of those who influence or make political decisions, that may have a significant impact on the use of services. Preoccupation with the total cost of care, especially for the poor and the elderly; reliance on competition as a means of distributing care; and emphasis on individual responsibility for health are examples of current changes that seem likely to influence substantially both the effective demand (as defined by the economist) and the use of health services. The real need for services as perceived by potential consumers may be unchanged, or even increased as the population becomes more elderly. In the absence of functional access, however, this need will not be reflected in increased service statistics.

In summary, as the elderly increase both in numbers and in proportion to the population, appropriateness of use will be the determinant of ICU services that can be controlled most readily. Technology will produce new interventions and social expectations will increase; these strong forces will support increased use of intensive care services. Careful analysis of efficacy and effectiveness, of marginal utility, and of contribution to life quality will be needed to put ICU care into perspective. This analysis will require a valid and reliable data base that relates health status, inverventions, and outcomes. In addition, it will require a clear explication of the social values and ethical principles that set limits for the economic, political, and institutional framework in which health care is provided.

Section 5. Summary

Patient classification systems have been developed to serve many purposes. The ICD, with its several revisions, has created a scheme for classifying patients by anatomical and functional diagnosis and disease etiology. Other systems have attempted to classify patients for utilization review, evaluation of treatment, institutional financial management, clinical decisionmaking, and numerous related purposes. It now seems clear that no single system can serve all purposes and that some purposes have unique classification requirements.

The present study has been conducted in response to interest in the problem of clinical decisionmaking for care of the elderly patient in the ICU. A number of factors support this as a probable major concern in the future.

- It is certain that the elderly, and especially the very elderly, will increase both in numbers and as a proportion of the population.
- Health services devoted to care of the elderly will increase; at least some of this care will be provided in the ICU. Estimates vary, with some suggesting that care of the elderly could overwhelm ICU resources in the future.
- The unremitting increase in high technology health care is likely to continue. With a few notable exceptions, new developments have led to care that

is more invasive and more costly than that which it has augmented or replaced.

* Questions have been raised about the effectiveness of ICU care in restoring critically ill patients to life that is functionally useful, or is at least comfortable and satisfying. This question is especially cogent for elderly ICU patients, who may have substantial chronic health system deficits in addition to their acute illness.

This study has been carried out by reviewing a substantial part of the rapidly expanding literature on patient classification systems. Primary emphasis has been upon those sytems that seem to have predictive power for clinical outcomes and that might, therefore, be useful to clinicians, patients, and their families in deciding about an appropriate ICU management plan for elderly patients. Included, in addition, have been several other systems that may have no direct application to ICU clinical decisionmaking but that have received considerable attention or use for related purposes.

At the outset, criteria were proposed as the basis for discriminating among systems according to their use in ICU decisionmaking. These criteria stipulated that the ideal system should:

* be derived from data that are readily available from observations at ICU admission, or as soon thereafter as possible, that can be measured objectively and

recorded routinely, and that require no intervention unrelated to appropriate individual care;

- be dependent on minimal resources beyond those required for patient care (equipment and personnel);
- produce easily a probability of outcome (death or survival at hospital discharge) that is both reliable and valid (as measured by sensitivity, specificity, and predictive values), and which takes age into account;
- have face and content validity, in order to enhance its acceptance by clinicians;
- have inter-hospital reliability and validity, be valid in multiple settings; and
- have marginal benefits that justify the marginal cost of the system.

As the study progressed it became apparent that patient classification systems had been developed using two distinctly different methods for establishing classification criteria:.

- a panel, or panels, of experts who define variables and assign weights for patient classification in a normative type of process;
- statistical modeling, based on empirical observations regarding a large number of patient, disease, and intervention variables.

Results of the study are reported using this descriptive distinction between methods of derivation.

The most widely recognized of the "panel of experts" method is a group of systems designated as the APACHE (Acute Physiology and Chronic Health Evaluation) types. The systems are described in the text. There follows a summary of the salient characteristics relevant to use in the ICU.

- Admission: since data are collected over 24-32 hours, there seems to be no use for admission decisions.
- Discharge: patients with low scores can be presumed less seriously ill and considered candidates for a lesser level of care.
- Triage: since scores are not calculated serially, it would be difficult to rank order patients with different length of stay by seriousness of illness.
- Monitoring progress: there are no reports of scores calculated after 24-32 hours of ICU care.
- Decisionmaking (the team, patient and family): information is probably more understandable and, hence, more acceptable to clinicians when scores have been transformed to probabilities. Actual use has not been reported.
- Quality assessment: since some data are ICU treatment-dependent it would be difficult to use any of these systems for evaluating ICU performance,

treatment efficacy, or admission/treatment practices of physicians.

The TISS system is completely dependent on treatment-related variables. Its use in the ICU can be summarized as follows:

- Admission - no use
- Discharge - low TISS scores may support a decision to discharge.
- Triage - from cumulative treatment data one might infer clinical condition. Rank ordering from these data, however, would be uncertain.
- Monitoring progress: reports of treatment intensity may reflect patient condition.
- Decisionmaking (the team, patient and family): no use.
- Quality assessment: without being able to control for seriousness of illness there seems to be no usefulness.

The MPM system, which has been developed by statistical modeling, falls into two categories: admission and 24/48 hour. This summary refers to the admission models only.

- Admission: use is plausible, since all data are available at admission. Actual use has not been reported.

- Discharge: patients with a low probability of mortality may be referred to a monitor unit soon after admission.
- Triage: augmented by clinical judgement, could be useful only for the admission end of triage decisions. No value for rank ordering patients in the ICU.
- Monitoring: no value.
- Decisionmaking (the team, patient, and family): direct estimate of probility may be helpful. Physician acceptance has not been tested.
- Quality assessment: since all variables can be measured on admission, thus controlling for seriousness of illness, this seems to be the only system that can be used for evaluating ICU performance, treatment efficacy, or the admission/treatment practices of physicians.

The MPM 24 hour and 48 hour models are being explored with the expectation that serially derived information will be useful for the full range of clinical decisionmaking, from ICU admission to discharge.

GLOSSARY

Code: Hospital terminology to designate the extent of resuscitative measures to be taken in the event of sudden cardiac arrest:

- full code: use all available measures until it is certain that resuscitation is impossible and the patient has been declared dead.
- no code: do not resuscitate (DNR) in the event of arrest; allow natural events to take their course.

Content validity: An estimate of the extent to which the research design and data gathering process measure what the investigation purports to measure.

Coronary care unit (CCU): An area similar to an ICU except that patients have acute coronary disease (such as myocardial infarction or strongly suspected infarction), unstable angina pectoris (chest pain), or disorders of cardiac rhythm.

Critical care unit: This is generally synonymous with the ICU. Sometimes it refers to a unit in which all, or virtually all, patients have multiple high intensity treatment requirements (e.g., after cardiac surgery, cardiac or liver transplant, or with major trauma).

External validity: An estimate of the extent to which the study design results in findings that can be applied to other populations and/or settings. It refers, at least in part, to the correspondence of the study population and/or setting to other populations and/or settings.

Face validity: An estimate of the extent to which there will be common acceptance by reasonably well informed observers that the study instruments really measure what they purport to measure.

Hemodynamic profile: With measurements of arterial and venous pressures, cardiac output, and arterial oxygen saturation, it is possible to measure the performance of the right and left heart, the peripheral circulation, and general metabolic functions.

Intensive care unit (ICU): An area in which there is a clustering of critically ill patients, each of whom receives 12-24 hours of nursing care per day, plus frequent physician visits for evaluation and intervention. Frequently there is use of life-support measures, such as use of mechanical ventilators and continuous infusions of potent medications to control arterial blood pressure. It may include some high risk observation (monitoring) patients as well as some who require routine but intensive treatment.

Intermediate unit: This is an inconsistently defined term. It usually refers to a unit that has been organized to provide more nursing services than are available on a general medical or surgical floor, usually six to eight hours of care per day for two to three days. Other terms that are generally comparable, but may have somewhat different service implications in some hospitals are step-down, observation, or progressive care unit. The exact criteria are less important than the concept that some patients' needs will be served well by a unit that has not been organized for the delivery of primarily highly intensive nursing care.

Internal validity: An estimate of the extent to which the study design produces findings that represent the "true" state of affairs and that effectively rule out alternative explanations.

Invasive monitoring: Continuous electronic measurement of pressures within the major arteries or central veins (e.g., vena cava). These procedures require that catheters be placed inside the femoral, radial, or axillary artery or the subclavian or internal jugular vein. The catheters are attached to transducers and then to pressure recorders.

Marginal cost: A measure or estimate of the additional cost of an additional service or treatment intervention. In this context it refers to the cost of patient care in an ICU that exceeds the cost for the same patient in a general medical or surgical floor.

Marginal utility: a measure or estimate of the benefits that accrue to a patient from ICU care above those benefits from care in a less intense therapeutic setting.

Multiple logistic regression (MLR): a commonly used statistical method for modeling the relationship between a binary or dichotomous outcome variable (e.g., live/die) and one or more explanatory variables (e.g., age, coma, blood gases). The model produces an estimated probability of the event (e.g., mortality) given the presence of the set of explanatory variables.

Opportunity costs: The cost (personal, functional, social, etc.) of opportunities foregone because of a particular expenditure. Thus, with fixed resources for a board of health a decision to begin a lead paint detection program may mean that a vision and hearing aid program for the elderly has to be foregone.

P-value: The probability of observing a difference or a result as large as the the one observed by chance alone. Generally, a small p-value (e.g., less than 0.05) suggests a statistically significant result.

Predictive value for dying: A reflection of the number of patients correctly predicted to die as a proportion of the total number of who had been predicted to die.

Predictive value for living: A reflection of the number of patients correctly predicted to live as a proportion of the total number who had been predicted to live.

Progressive care: This sometimes refers to an area, either within or adjacent to the ICU, that provides eight to twelve hours of nursing care per day after the most acute phase of ICU care. It may be the first step prior to transfer to a general medical or surgical floor.

Reliability: The reproducibility of a study result (i.e., obtaining the same finding) if the study were to be repeated under similar circumstances. Reliability also refers to the ability of data collectors to correctly abstract data contained in medical records.

Sensitivity: A reflection of the number of patients correctly predicted to die as a proportion of the total number who actually died.

Specificity: A reflection of the number of patients correctly predicted to live as a proportion of the total number who actually lived.

Subspecialty ICU: A unit that confines admissions to patients who have a class of well-defined special treatment needs (e.g., burn, trauma, neurosurgical, respiratory, or pediatric).

Swan-Ganz catheter monitoring: A special catheter with a balloon and a thermistor in the end is floated into a central vein, then manipulated through the right atrium and the right ventricle into the pulmonary artery outflow. In patients with complicated hemodynamic problems, estimates of fluid balance are possible when not obtainable clinically. When attached to a cardiac output catheter, it can measure cardiac output intermittently.

Telemetry unit: This is similar to the intermediate unit except that it has been specially equipped to provide cardiac rhythm monitoring for patients with suspected myocardial infarction either if they have been determined to be at low risk of complication or after the acute phase of CCU medical care or cardiac surgery. Electocardiographic monitoring is accomplished by use of a transmitter, not a fixed wire (to allow patient mobility). Computerized interpretation of signals is often provided.

Total correct classification: A reflection of the proportion of patients whose actual outcome matched their predicted outcome.

Triage: A term that originally referred to the military practice of devoting scarce medical resources first to treating and rehabilitating casualties who could be returned to duty. Here it refers to rank ordering patients by need for care so that if ICU bed need exceeds supply, the patient(s) in least need of ICU care can be moved to another hospital floor.

Validity: see content validity, external validity, face validity, internal validity.

Zero-sum game: A term that arises from game theory. Several game models have been proposed to describe the interactional dimensions and reward possibilities of social situations. A zero-sum game is one in which the total "chips" or rewards are fixed; any gain by one player can be achieved only at the expense of one or more of the others.

Bibliography

Aaron, H.F., Schwartz, W.B., "The Painful Prescription - Rationing Hospital Care" (Washington, DC: The Brookings Institution, 1984).

Abram, H.S., Wadlington, W., "Selection of Patients for Artificial and Transplanted Organs," Ann. Intern. Med. 69:615, 1968.

Abramson, N.S., Wald, K.S., Grenvik, A.N.A., et al., "Adverse Occurrences in Intensive Care Units," J.A.M.A. 244(14):1582, 1980.

Afifi, A.A., Chang, P.C., Liu ,V.Y., et al., "Prognostic Indexes in Acute Myocardial Infarction Complicated by Shock", Amer. J. Cardiol. 33:826, 1974.

Afifi, A.A., Sacks, S.T., Liu, V.Y., et al., "Accumulative Prognostic Index for Patients with Barbiturate, Glutethimide and Meprobamate Intoxication," N. Engl. J. Med. 285:1497, 1971.

American Hospital Association: Hospital Statistics, 1977 to 1983 editions (Chicago, IL: American Hospital Association, 1977 to 1983).

American Medical News, "Court Vacates Murder Against Two MDs," Oct. 14, 1983, p. 1.

Annas, G.J., "When Procedures Limit Rights: From Quinlan to Conroy," Hastings Cen. Rep. 15(2):24, 1985.

Arthur D. Little, Inc., "Planning for General Medical and Surgical Intensive Care Units: A Technical Assistance Document for Planning Agencies," prepared for the U.S. Department of Health, Education, and Welfare, publication No. (HRS)79-14020 (Washington, DC: U.S. Government Printing Office, 1979).

Avorn, J., "Benefit and Cost Analysis in Geriatric Care: Turning Age Discrimination into Health Policy," N. Engl. J. Med. (310)20:1294, 1984.

Ayres, S.M., "Critical Care Medicine," introduction in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayres (eds.) (Baltimore, MD: Williams & Wilkins,1984).

Baker, R., Knaus, W.A., Draper, E.A., et al., "Initial Evaluation of No-Resuscitation Decisions," manuscript in preparation, 1983.

Baker, S.P., O'Neill, B., Haddon, W., Jr., et al., "The Injury Severity Score: A Method For Describing Patients with Multiple Injuries and Evaluating Emergency Care," The Journal of Trauma 14(3):187, 1974.

Bartlett, R.H., Gazzaniga, A.B., Wilson, A.F., et al., "Mortality Prediction in Adult Respiratory Insufficiency," Chest 67(6):680, 1975.

Bates, D.V., "Workshop on Intensive Care Units," comments of the National Academy of Sciences, National Research Council, Committee on Anesthesia, Anesthesiology 25:192, 1964.

Bayer, R., Callahan, D., Fletcher, J., et al., "The Care of the Terminally Ill: Mortality and Economics," N. Engl. J. Med. (309)24:1490, 1983.

Beauchamp, T.L., and Childress, J.F., Principles of Biomedical Ethics 2nd Ed. (New York: Oxford University Press, 1983).

Becker, E.L., "Finite Resources and Medical Triage," Am. J. Med. 66:549, 1979.

Bedell, S., and Delbanco, T.L., "Choices About Cardiopulmonary Resuscitation in the Hospital - When Do Physicians Talk With Patients?" N. Engl. J. Med. 310(17):1089, 1984.

Bell, J.A., Bradley, R.D., Jenkins, B.S., "Six Years of Multidisciplinary Intensive Care," Brit. Med. J. 2:483, 1974.

Bellah, R.N., Maden, R., Sullivan, W.M., et al., "Habits of the Heart" (Berkeley CA, U Cal. Press, 1985).

Bendixen, H.H., "The Cost of Intensive Care," ch. 22 in "Costs, Risks, and Benefits of Surgery," J.P. Bunker, B.A. Barnes, and F. Mosteller (eds.) (New York: Oxford University Press, 1977).

Bendixen, H.H., Egbert, L.D., Hedley-White, J., et al., "Respiratory Care" (St. Louis, MO: The C.V. Mosby Co., 1965).

Bergner, M., Bobbitt, R.A., Carter, W.B., et al., "The Sickness Impact Profile: Development and Final Revision of a Health Status Measure," Medical Care 19(8):787, 1981.

Bertram, D.A., Schumacher, D.N., Horn, S.D., et al., "Hospital Case Mix Groupings and Generic Algorithms," Quality Review Bulletin Jan. 1982.

Bicknell, W.J., and Walsh, D.C., "Certification-of-Need: The Massachusetts Experience," N. Engl. J. Med. 292:1054, 1975.

Biles, B., Schramm, C.J. and Atkinson, J.G., "Hospital Cost Inflation Under State Rate-Setting Programs," N. Engl. J. Med. 303(12):664, 1980.

Bion, J.F., Edlin, S.A., Ramsay, G., et al., "Validation of Prognostic Score in Critically Ill Patients Undergoing Transport," Brit. Med. J. 291:432, August 1985.

Birnbaum, M.L., Robinson, N.E., Hunter-Handler, D.L., et al., "Comparison of Ambulance and Mobile Critical Care Unit for Transfer of Patients with Ischemic Heart Disease," Crit. Care Med. 12(3):240, 1984.

Black, P.M., "Predicting the Outcome from Hypoxic-Ischemic Coma: Medical and Ethical Implications," J.A.M.A. 254(9):1251, 1985.

Bland, R.D., and Shoemaker, W.C., "The Severity Index Score as a Method for Data Reduction in the Surgical ICU," Computers and Biomedical Research 16:395, 1983.

Bloom, B.S., and Peterson, O.L., "End Results, Cost and Productivity of Coronary Care Units," N. Engl. J. Med 288(2):72, 1973.

Bloom, B.S., and Peterson O.L., "Patient Needs and Medical Care Planning: The Coronary Care Unit as a Model," N. Engl. J. Med. 290:1171, 1974.

Bolsen, B., "MDs, Lawyers Probe Ethical, Legal Issues in Ending Treatment," American Medical News, p. 17, Apr. 6, 1984.

Bovbjerg, R., "The Medical Malpractice Standard of Care: HMOs and Customary Practice," Duke Law J. 1975(6), 1976.

Boyd, R., "Workshop on Intensive Care Units," comments of the National Academy of Sciences, National Research Council, Committee on Anesthesia, Anesthesiology 25:192, 1964.

Bradburn, B.G., and Hewitt, P.B., "The Effects of the Intensive Therapy Ward Environment on Patients' Subjective Impressions: A Followup Study," Intensive Care Med. 7:15, 1980.

Brennan, M.A., "Resumption of Work Following Discharge from Hospital," Irish Medical Journal 74(1):5, 1981.

British Medical Association, Planning Unit, report of the Working Party on Intensive Care, 1:5, 1967.

Brooks, T.A., "Withholding Treatment and Orders Not to Resuscitate," Ch. 10 in "Legal and Ethical Aspects of Treating Critically and Terminally Ill Patients," A.E. Doudera and J.D. Peters (eds.) (Ann Arbor, MI: Association of University Programs in Health Administration, 1982).

Brown, N.K., and Thompson, D.J., "Nontreatment of Fever in Extended-Care Facilities," N. Engl. J. Med. 300(22):1246, 1979.

Bulkley, B.H., "The Coronary Care Unit," Ch. 1 in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayres (eds.) (Baltimore, MD: Williams & Wilkins, 1984).

Byrick, R.J., Mindorff, C., McKee, L., et al., "Cost-Effectiveness of Intensive Care for Respiratory Failure Patients," Crit. Care Med. 8(6):332, 1980.

Cadmus, R.R., "Special Care for the Critical Case," Hospitals 20:65, 1954.

Callahan, J.A., Spiekerman, R.E., Broadbent, J.C., et al., "St. Mary's Hospital-Mayo Clinic Medical Intensive Care Units: II. Patient Population," Mayo Clin. Proc. 42:332, 1967.

Campbell, D., Reid, J.M., Tefler, A.B.M., et al., "Four Years of Respiratory Intensive Care," Brit. Med. J. 4:255, 1967.

Campion, E.W., Mulley, A.G., Goldstein, R.L., et al., "Medical Intensive Care for the Elderly: A Study of Current Use, Costs, and Outcomes," J.A.M.A. 246:2052, 1981.

Campion, E.W., Mulley, A.G., Goldstein, R.L., et al., "Intensive Treatment for the Elderly," reply to Letter to the Editor, J.A.M.A. 247(23):3186, 1982.

Caroline, N.L., "Quo Vadis Intensive Care: More Intensive or More Care?" guest editorial in Crit. Care Med. 5(5), 1977.

Carroll, D.G., "Patterns of Medical Care in a Municipal Hospital Intensive Care Unit: Convenience or Necessity?" Maryland State Med. J. 20:89, 1971.

Casali, R., et al., "Acute Renal Insufficiency Complicating Major Cardiovascular Surgery," Am. Surg. 181:370, 1975.

Cassem, N.H., "When to Disconnect the Respirator," Psychiatric Ann. 9:38, 1979.

Cassem, N.H., and Hackett, T.P., "Psychiatric Consultation in a Coronary Care Unit," Ann. Intern. Med. 75:9, 1971.

Champion, H.R., Sacco, W.J., "Measurement of Patient Illness Severity," Crit. Care Med. 10(8):552, 1982.

Champion, H.R., Sacco, W.J., Carnazzo, A.J., et al., "Trauma Score," Crit. Care Med. 9:672, 1981.

Champion, H.R., Sacco, W.J., Hannan, D.S., et al., "Assessment of Injury Severity: The Triage Index," Crit. Care Med. (8)4:201-208, 1980a.

Champion, H.R., Sacco, W.J., Hunt, T.K., "Trauma Severity Scoring to Predict Mortality," World J. Surg. 7:4, 1983.

Champion, H.R., Sacco, W.J., Lepper, R.L., et al., "An Anatomic Index of Injury Severity", The Journal of Trauma 20(3):197, 1980b.

Chassin, M.R., "Costs and Outcomes of Medical Intensive Care," Medical Care 20(2):165, 1982.

Chassin, M.R., Brook, R.H., Park, R.E., "Variations in the Use of Medical and Surgical Services by the Medicare Population," N. Engl. J. Med. 314(5):285, 1986.

Civetta, J.M., "The Inverse Relationship Between Cost and Survival," J. Surg. Res. 14(3):265, 1973.

Civetta, J.M., "The ICU Milieu: An Evaluation of the Allocation of a Limited Resource," Resp. Care 21(6):501, 1976.

Civetta, J.M., "Selection of Patients for Intensive Care," in Recent Advances in Intensive Therapy, I.M. Ledingham (ed.) (New York: Churchill Livingston, 1977).

Civetta, J.M., "Beyond Technology: Intensive Care in the 1980s," Crit. Care Med. 9(11):763, 1981.

Clark, T.J.H., Collins, J.V. Evans, T.R., et al., "A Review of Experience Operating a General Medical Intensive Care Unit," Brit. Med. J. 1:158, 1971.

Clemmer, T.P., Orme, J.F., Jr., Thomas, F.O., et al., "A Prospective Comparison of Outcome of Critically Injured Patients Cared for at a Full Service Community Hospital Versus a Level I Trauma Center," Crit. Care Med. 12(3):232, 1984.

Coelen, C., and Sullivan, D., "An Analysis of the Effects of Prospective Reimbursement Programs on Hospital Care," Health Care Finan. Rev. 2:3, 1981.

Cohen, C.B., "Ethical Problems of Intensive Care," Anesthesiology 47:217, 1977.

Cohn, J.D., Engler, P.E., Del Guercio, L.R.M., "The Automated Physiologic Profile," Crit. Care Med. 3(2):51, 1975.

Coulton, C.J., McClish, D., Doremus, H., et al., "Implications of DRG Payment for Medical Intensive Care," Medical Care 23(8):977, 1985.

Cranshaw, R., Garland, M.J., Hines, B., et al., "Oregon Health Decisions: An Experiment with Informed Community Consent," J.A.M.A. 254(22):3213, 1985.

Crockett, G.S., and Barr, A., "An Intensive Care Unit: Two Years Experience in a Provincial Hospital," Brit. Med. J. 2:1173, 1965.

Cromwell, J., Mitchell, J.B., Windham, S.R., "The Cost Dynamics of Critical Illness," prepared by Health Economics Research, Inc., for the National Center for Health Services Research, Office of the Assistant Secretary for Health, U.S. Department of Health and Human Services, grant No. HS 04026, 1981.

Cromwell, J., and Kanak, J.R., "The Effects of Prospective Reimbursement Programs on Hospital Adoption and Service Sharing," Health Care Finan. Rev. 4(2):67, 1982.

Cullen, D.J., "Results and Costs of Intensive Care," Anesthesiology 47:203, 1977.

Cullen, D.J., "Surgical Intensive Care: Current Perceptions and Problems," Crit. Care Med. 9:295, 1981.

Cullen, D.J., "The Importance of Comparative Data in Critical Care Analysis," Crit. Care Med. 10(9):618, 1982.

Cullen, D.J., "Results, Charges, and Benefits of Intensive Care for Critically Ill Patients," presentation at the National Institute of Health Consensus Development Conference, Critical Care Medicine, 1983.

Cullen, D.J., Civetta, J.M., Briggs, B.A., et al., "Therapeutic Intervention Scoring System: A Method for Quantitative Comparison of Patient Care," Crit. Care Med . 2:57, 1974.

Cullen, D.J., Ferrara, L.C., Briggs, B.A., et al., "Survival, Hospitalization Charges and Follow-up Results in Critically Ill Patients," N. Engl. J. Med. 294(18):982, 1976.

Cullen, D.J., Ferrara, L.C., Gilbert, J., et al., "Indicators of Intensive Care in Critically Ill Patients," Crit. Care Med. 5:173, 1977.

Cullen, D.J., Keene, R., Kunsman, J.M., et al., "Results, Charges and Benefits of Intensive Care for Critically Ill Patients - Update 1983," Crit. Care Med. 12:102, 1984.

Cullen, D.J., Keene, R., Waternaux, C., et al., "Objective Quantitative Measurement of Severity of Illness in Critically Ill Patients," Crit. Care Med. 12(3):155, 1984.

Cullen, D.J., Peterson, H., "Severity of Illness, Outcome Analysis, and Cost of Intensive Care for Critically Ill Patients," in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayres (eds.) (Baltimore, MD: Williams & Wilkins, 1984).

D'Agostino, R.B., and Pozen, M.W., "The Logistic Regression Function As an Aid in the Detection of Acute Coronary Disease in Emergency Patients," Statistics in Medicine 1(1):41, 1982.

Davidson, I.A., Bargh, W., Cruickshank, A.N., et al., "Crush Injuries of the Chest: A Followup Study of Patients Treated in an Artificial Ventilation Unit," Thorax 24:563, 1969.

Davis, K, and Schoen, C., "Health and the War on Poverty," (Washington, DC: Brookings Institute, 1978).

Davis, P.B., di Sant'Angnese, P.A., "Assisted Ventilation for Patients With Cystic Fibrosis," J.A.M.A. 239(18):1851, 1978.

Day, H.W., "Effectiveness of an Intensive Coronary Care Area," Am. J. Cardiology 15:51, 1965.

Derzon, R.A., "Influences of Reimbursement Policies on Technology," in "Critical Issues in Medical Technology," B.J. McNeil and E.G. Cravalho (eds.) (Boston: Auburn House Publishing Co., 1982).

Detsky, A.S., Stricker, S.C., Mulley, A.G., et al., "Prognosis, Survival and the Expenditure of Hospital Resources for Patients in an Intensive Care Unit," N. Engl. J. Med. 305(12):667, 1981.

Dikmen, S., Reitan, R.M., Temkin, N.R., "Neuropsychological Recovery in Head Injury," Archives of Neurology (40):333, 1983.

Dlin, B., Rosen, H., Dickstein, K., et al., "The Problems of Sleep and Rest in the Intensive Care Unit," Psychosomatics 12(3):155, 1971.

Dolenc, D.A., and Dougherty, C.J., "DRGs: The Counterrevolution in Financing Health Care," The Hastings Center Report 15(3):19, 1985.

Donowitz, L.G., Wenzel, R.P., Hoyt, J.W., "High Risk of Hospital-Acquired Infection in the ICU Patient," Crit. Care Med. 10(6):355, 1982.

Dornhorst, A.C., comments on Intensive Care Units in Section of Anaesthetics, "Proceedings of the Royal Society of Medicine" 59:1293, 1966.

Downs, J.B., "Intensive Care and the Adult Respiratory Distress Syndrome," Ch. 14 in "Major Issues in Critical Care Medicine," J.D. Parrillo and S.M. Ayers (eds.) (Baltimore, MD: Williams & Wilkins, 1984).

Drake, W.E., Jr., et al., "Acute Stroke Management and Patient Outcome: The Value of Neurovascular Care Units (NCU)," Stroke 4:933, 1973.

Draper, E.A., "Benefits and Costs of Intensive Care," Image: the Journal of Nursing Scholarship 15(3):90, 1983.

Draper, E.A., Wagner, D.P., Knaus, W. A., "The Use of Intensive Care: A Comparison of a University and Community Hospital," Health Care Finan. Rev. 3:49, 1981.

Duke Law Journal, "The Medical Malpractice Threat: A Study of Defensive Medicine," p. 939, 1971.

Edlich, R.F., Rodeheaver, G.T., Halfacre, S.E., et al., "Systems Conceptualization of Burn Care on a Regional Basis," Topics in Emergency Medicine 3:7, 1981.

Engelhardt, H.T., Jr., "Case Studies in Bioethics: Case No. 228, A Demand to Die," The Hastings Center Report 5:9, 1975.

Epstein, F.H., "Responsibility of the Physician in the Preservation of Life," Arch. Intern. Med. 139:919, 1979.

Etheredge, L., "An Aging Society and the Federal Deficit," Milbank Mem. Fund Q. 62(4):521, 1984.

Equitable Life Assurance Society of the United States, Hospital Daily Service Charges, 1982, catalog No. 104283 (New York: Equitable Life Assurance Society, 1982).

Feder, J., Hadley, J., Holohan, J., "Insuring the Nation's Health: Market Competition, Catastrophic and Comprehensive Approaches," (Washington, DC: The Urban Institute, 1981).

Federal Register, 45:21582, 1980.

Federal Register, 48(171)39752, 1983.

Federal Register, 49(129):27422, 1984.

Fedullo, A.J., and Swinburne, A.J., "Relationship of Patient Age to Cost and Survival in a Medical ICU," Crit. Care Med. 11(3):155, 1983.

Feinstein, A.R., "An Additional Basic Science for Clinical Medicine: The Constraining Fundamental Paradigms," Ann. Int. Med. 99(3):393, 1983a.

Feinstein, A.R. "An Additional Basic Science for Clinical Medicine: The Limitations of Randomized Trials," Ann. Int. Med. 99(4):544, 1983b.

Feinstein, A.R., "An Additional Basic Science for Clinical Medicine: The Challenges of Comparison and Measurement," Ann. Int. Med. 99(5):705, 1983c.

Feinstein, A.R., "An Additional Basic Science for Clinical Medicine: The Development of Clinimetrics," Ann. Int. Med. 99(6):843, 1983d.

Feldman, R., Sloan, F., Paringer, L., et al., "An Analysis of Hospitals' Methods of Compensating Physicians," The Urban Institute, working paper No. 1302-02, supported by the Health Care Financing Administration grant No. 95-P-97176/3-02, 1979.

Feller, I., and Crane, K.H., "National Burn Information Exchange," Surgical Clinics of North America 50:1425, 1970.

Feller, I., Flora, J.D., Bawol, R., "Baseline Results of Therapy for Burned Patients," J.A.M.A. 236:1943, 1976.

Feller, I., Tholen, D., Cornell, R.G., "Improvements in Burn Care, 1965 to 1979," J.A.M.A. 244:2074, 1980.

Fetter, R.B., Shin, Y., Freeman, J.L., et al., "Case Mix Definition by Diagnosis-Related Groups, Medical Care (18)(2:Suppl):1, 1980.

Fineberg, H.V., Scadden, D., Godman, L., "Care of Patients With a Low Probability of Acute Myocardial Infarction - Cost Effectiveness of Alternatives to Coronary Care Unit Admission," N. Engl. J. Med. 310(20):1301, 1984.

Finkler, S.A., "The Distinction Between Cost and Charges," Ann. Intern. Med. 96(1):102, 1982.

Fisher, C.R., "Differences by Age Groups in Health Care Spending," Health Care Finan. Rev. 1(4):65 HHS #03045, 1980.

Fleiss, J.L., "Statistical Methods for Rates and Proportions," Second Edition. (New York: John Wiley & Sons, p. 217,1981) .

Franco, D., Bismuth, H., "Five Years of Experience With an Intensive Care Unit Specializing in Abdominal Surgery," Prog. Surg. 15:37, 1977.

Franklin, C., and Jackson, D., "Discharge Decision-Making in a Medical ICU: Characteristics of Unexpected Readmissions," Crit. Care Med. 11:61, 1983.

Freid, C., "Rights in Health Care - Beyond Equity and Efficiency," N. Engl. J. Med. 293:241, 1975.

Fries, J.F., "Aging, Natural Death, and the Compression of Morbidity," N. Engl. J. Med. 303(3):130, 1980.

Fries, J.F., "The Compression of Morbidity," Milbank Mem. Fund Q. 61(3):397, 1983.

Fuchs, V.R., "Who Shall Live? Health, Economics and Social Choice" (New York: Basic Books, Inc., 1974).

Fuchs, R., and Scheidt, S., "Improved Criteria for Admission to Cardiac Care Units," J.A.M.A. 246:2037, 1981.

Galbally, B.P., "The Hospital Service - Targets for Tomorrow: Intensive Care-Productivity and Cost Control," National Hospital 16:15, 1972.

Gibson, R.M., Waldo, D.R., Levit, K.R., "National Health Expenditures, 1982," Health Care Finan. Rev. 5(1):1, 1983.

Gilligan, J.E., McCleave, D.J., Worthley, L., et al., "The Role of Intensive Care Units," Aust. N.Z. J. Surg. 46(4):301, 1976.

Gilson, B.S., Gilson, J.S., Bergner, M., et al., "The Sickness Impact Profile: Development of an Outcome Measure of Health Care," Am. J. Public Health, 65(12):1304, 1975.

Goldberg, J., Levy, P.S., Morkovin, V., et al., "Mortality from Traumatic Injuries. A Case-Control Study Using Data from the National Hospital Discharge Survey," Medical Care 21:692, 1983.

Goldberg, J.L., Goldberg, J., Levy, P.S., et al., "Measuring the Severity of Injury: The Validity of the Revised Estimated Survival Probability Index," The Journal of Trauma 24(5):420, 1984.

Goldman, L., Caldera, D.L., Nussbaum, S.R., et al., "Multifactorial Index of Cardiac Risk in Noncardiac Surgical Procedures," N. Engl. J. of Med. 297(16):845, 1977.

Goldman, M.D., Weinberg, M., Weisberg, M., et al., "A Computer-Derived Protocol to Aid in the Diagnosis of Emergency Room Patients with Acute Chest Pain," N. Engl. J. Med. 307(10):588,1982.

Gonnella, J.S., Hornbrook, M.C., Louis, D.Z., "Staging of Disease: A Case-Mix Measurement," J.A.M.A. 251:637, 1984.

Greenbaum, D.M., and Holbrook, P.R., "Fellowship Programs in Critical Care Medicine - 1982," Crit. Care Med. 10(5):347, 1982.

Greenbaum, D.M., and Holbrook, P.R., "Fellowship Programs in Critical Care Medicine, 1982, Addendum," Crit. Care Med. 10(11):785, 1982.

Grenvik, A., " 'Terminal Weaning,' Discontinuance of Life-Support Therapy in the Terminally Ill Patient," Crit. Care Med. 5:394, 1983.

Grenvik, A. "Subspecialty Certification in Critical Care Medicine by American Specialty Boards," Crit. Care Med. 13:1001, 1985.

Grenvik, A., Leonard, J.J., Arens, J.F., et al., "Critical Care Medicine: Certification as a Multidisciplinary Subspecialty," Crit. Care Med. 9:117, 1981.

Grenvik, A., Pouner, D.J., Snyder, J.V., et al., "Cessation of Therapy in Terminal Illness and Brain Death," Crit. Care Med. 6(4):284, 1978.

Griner, P.F., "Treatment of Acute Pulmonary Edema: Conventional or Intensive Care?" Ann. Intern. Med. 77(4):501, 1972.

Griner, P.F., "Medical Intensive Care in the Teaching Hospital: Costs Versus Benefits," Ann. Intern. Med. 78(4):581, 1973.

Griner, P.F., "Use of Laboratory Tests in a Teaching Hospital: Long-Term Trends: Reductions in Use and Relative Costs," Ann. Intern. Med. 90:243, 1979.

Griner, P.F. "Pulmonary Edema and the Intensive Care Unit," Ch. 13 in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayers (eds.) (Baltimore, MD: Williams & Wilkins, 1984).

Griner, P.F., and Liptzin, B., "Use of the Laboratory in a Teaching Hospital: Implications for Patient Care, Education, and Hospital Costs," Ann. Intern. Med. 75(2):157, 1971.

Gruenberg, E.M., "The Failures of Success," Milbank Mem. Fund Q. 55(1):3, 1977.

Guenter, C.A., and Welch, M.H., "Pulmonary Medicine" (Philadelphia: J.B. Lippincott Co., 1977).

Gunby, P., "Compromise Reached on Suggested Intervals Between Pap Tests," J.A.M.A. 13(244):1411, 1980.

Gustafson, D.H., Fryback, D.G., Rose, J.H., et al., "An Evaluation of Multiple Trauma Severity Indices Created by Different Index Development Strategies," Med. Care 21:674, 1983.

Hackett, T.P., "The Psychiatrist's View of the ICU: Vital Signs Stable But Outlook Guarded," Psychiatric Ann. 6:10, 1976.

Hackett, T.P., Cassem, N.H., Wishnie, H.A., "The Coronary-Care Unit: An Appraisal of its Psychologic Hazards," N. Engl. J. Med. 279(25):1365, 1968.

Halbritter, R., Haider, M., Rackwitz, R., et al., "Zur Prognose der Langzeitbeadmung auf einer internen intensiv Station," Intensive Med. 16:233, 1979.

Haley, R.W., Culver, D.H., Morgan, W.M., et al., "Identifying Patients at High Risk of Surgical Wound Infection: A Simple Multivariate Index of Patient Susceptibility and Wound Contamination," Am. J. Epidemiol. 121(2):206, 1985.

Haley, R.W., Schaberg, D.R., Crossley, K.B., "Extra Charges and Prolongation of Stay Attributable to Nosocomial Infections: A Perspective in Our Hospital Comparison," Am. J. Med. 70:51, 1981.

Hanley, J.A., and McNeil, B.J., "The Meaning and Use of the Area Under a Receiver Operating Characteristic (ROC) Curve," Radiology 143(1):29, 1982.

Harrell, F.E., Jr., Lee, K.L., Califf, R.M., et al., "Regression Modelling Strategies for Improved Prognostic Prediction," Statistics in Medicine (3):143, 1984.

Harris, J., "Price Rules for Hospitals," Bell Journal of Economics 10:224, 1979.

Hauser, M.J., Tabak, J., Baier, H., "Survival of Patients With Cancer in a Medical Critical Care Unit," Arch. Intern. Med. 142:527, 1982.

Havighurst, C.C., Blumstein, J.F., Bovbjerg, R., "Strategies in Underwriting the Costs of Catastrophic Disease," Law & Contemporary Problems 40(4):122, 1976.

Hegyvary, S.T., and Haussman, R.K.D., "Monitoring Nursing Care Quality," J. Nurs. Admin. 5(5):17, 1975.

Helbing, C., "Medicare: Use of and Charges for Accommodation and Ancillary Services in Short-Stay Hospitals, 1979," U.S. Department of Health and Human Services, Office of Research, Health Care Financing Administration, mimeograph undated.

Helbing, C., Supervisory Satistician, Office of Research, Health Care Financing Administration, U.S. Department of Health and Human Services, personal communication, 1983.

Hewitt, P.B., "Subjective Follow up of Patients from a Surgical Intensive Therapy Ward," Brit. Med. J. 4:669, 1970.

Hilberman, M., "The Evolution of Intensive Care Units," Crit. Care Med. 3(4):159, 1975.

Hook, E.W., Horton, C.A., Schaberg, D.R., "Failure of Intensive Care Unit Support to Influence Mortality from Pneumococcal Bacteremia," J.A.M.A. 249(8):1055, 1983.

Hopkins, C.C., "Identification of Infection Problems in Intensive Care Units," Crit. Care Q. 3(4):1, 1981.

Horn, S.D., "Validity, Reliability, and Implications of an Index of Inpatient Severity of Illness," Medical Care XIX(3):354, 1981.

Horn, S.D., "Does Severity of Illness Make a Difference in Prospective Payment?" Healthcare Financing Management, 5:49, 1983.

Horn, S.D., "Measuring Severity of Illness: Comparisons Across Institutions," A.J.P.H. 73(1):25, 1983.

Horn, S.D., Chachich, B., Clopton, C., "Measuring Severity of Illness: A Reliability Study," Medical Care 21(7):705, 1983.

Horn, S.D., and Schumacher, D.N., "Comparing Classification Methods: Measurement of Variations in Charges, Length of Stay, and Mortality," Medical Care 20(5):489, 1983.

Horn, S.D., and Sharkey, P.D., "Measuring Severity of Illness to Predict Patient Resource Use Within DRGs," Inquiry (20) Winter, 1983.

Horn, S.D., Sharkey, P.D., Bertram, D.A., "Measuring Severity of Illness: Homogeneous Case Mix Groups," Medical Care XXI(1):1983.

Horn, S.D., Sharkey, P.D., Chambers A.F., et al., "Severity of Illness Within DRGs: Impact on Prospective Payment," Am. J. Public Health 75(10):1195, 1985.

Horwitz, R.I., and Feinstein, A.R., "Improved Observational Method for Studying Therapeutic Efficacy," J.A.M.A. 246(21):2455, 1981.

Hosmer, D.W., and Lemeshow, S., "Goodness of Fit Tests for the Multiple Logistic Regression Model," Communications in Statistics-Theory and Methods A9:1043, 1980.

Howell, J.R., "Regulating Hospital Capital Investment: The Experience in Massachusetts," National Center for Health Services Research, Research Summary Series, U.S. Department of Health and Human Services publication No. (PHS) 81-3298 (Hyattsville, MD: U.S. Government Printing Office, 1981).

Hubner, P.J.B., Goldberg, M.J., Lawson, C.W., "Value of Routine Cardiac Monitoring in the Management of Acute Myocardial Infarction Outside a Coronary Care Unit," Brit. Med. J. 1:815, 1969.

Ibsen, B., "The Anaesthetist's Viewpoint on the Treatment of Respiratory Complications in Poliomyelitis During the Epidemic in Copenhagen, 1952," Proc. Royal Soc. Med. 47:6, 1954.

Iglehart, J.K., "The Politics of Transplantation," N. Engl. J. Med. 310(13):864, 1984.

Imbus, S.H., and Zawacki, B.E., "Autonomy for Burned Patients When Survival is Unprecedented," N. Engl. J. Med. 297(6):308, 1977.

Jackson, B.S., "A One-Year Mortality Study of the Most Acutely Ill Patients in a Medical-Surgical Intensive Care Unit: Toward Developing a Model for Selection of Recipients of Intensive Care," Heart and Lung 13(2):132, 1984.

Jackson, D.L., and Younger, S., "Patient Autonomy and 'Death With Dignity,' " N. Engl. J. Med. 301(8):404, 1979.

Jenkins, C.D., Stanton, B.A., Savageau, J.A., et al., "Coronary Artery Bypass Surgery: Physical, Psychological, Social, and Economic Outcomes Six Months Later," J.A.M.A. 250(6):782, 1983.

Jennett, B., "Resource Allocation for the Severely Brain Damaged," Arch. Neurol. 33:595, 1976.

Joint Commission on Accreditation of Hospitals, Accreditation Manual for Hospitals (Chicago, IL: 1980).

Jones, J., Hoggart, B., Withey, J., et al., "What the Patients Say: A Study of Reactions to the Intensive Care Unit," Intensive Care Med. 5:89, 1979.

Journal of the American Medical Association, "Guidelines for Organization of Critical Care Units," 222(12):1532, 1972.

Kalla, A.H., and Voss, E.C., Jr., "Is Intensive Care Unit Cost Effective?" The West Virginia Med. J. 76(7):151, 1980.

Katz, S., Branch, L.G., Branson, M.H., et al., "Active Life Expectancy," New Engl. J. of Med. 309(20):1218, 1983.

Keene, R.A., and Cullen, D.J., "Therapeutic Intervention Scoring System: Update 1983," Crit. Care Med. 11:1, 1983.

Kiely, W., "Critical Care Psychiatric Syndromes," Heart and Lung 2(1):54, 1973.

Kiely, W.F., and Prucci, W.R., "Psychiatric Aspects of Critical Care," ch. 4 in "Mosby's Comprehensive Review of Critical Care," D.A. Zschoche (ed.) (St. Louis, MO: The C.V. Mosby Co., 1981).

Kirsch, J., "A Death at Kaiser Hospital," California p. 79, 1982.

Klarman, H.E., Francis, J.D., Rosenthal, A.D., "Cost-Effectiveness Analysis Applied to the Treatment of Chronic Renal Disease," Medical Care 6:48, 1968.

Knaus, W.A., "Changing the Cause of Death," editorial, J.A.M.A. 249(8):1059, 1983.

Knaus, W.A., Draper, E.A., Wagner, D.P., "Toward Quality Review in Intensive Care: The APACHE System," QRB 196-204, July 1983.

Knaus, W.A., Draper, E.A., Wagner, D.P., "The Use of Intensive Care: New Research Initiatives and Their Implications for National Health Policy," Milbank Mem. Fund Q./Health & Society 61(4):561, fall 1983.

Knaus, W.A., Draper, E.A., Wagner, D.P., "Evaluating Medical-Surgical Intensive Care Units," Ch. 4 in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayers (eds.) (Baltimore, MD: Williams & Wilkins, 1984).

Knaus, W.A., Draper E.A., Wagner, D.P., et al., "Evaluating Outcome from Intensive Care: A Preliminary Multihospital Comparison," Crit. Care Med. 10:491-496,1982.

Knaus, W.A., Draper, E.A. Wagner, D.P., et al., "Prognosis from Combined Organ-System Failure: A National Study," Crit. Care Med. (12)3:239, March 1984.

Knaus, W.A., Draper, E.A., Wagner, D.P., et al., "APACHE II: A Severity of Disease Classification System," Crit. Care Med. 13:818-829, 1985.

Knaus, W.A., Draper, E.A., Wagner, D.P., et al., "An Evaluation of Outcome from Intensive Care in Major Medical Centers," to appear in Ann. Intern. Med.

Knaus, W.A., Le Gall, J.R., Wagner, D.P., et al., "A Comparison of Intensive Care in the U.S.A. and France," Lancet pp 642-646, September 18, 1982.

Knaus, W.A., and Thibault, G.E., "Intensive Care Units Today," in "Critical Issues in Medical Technology," B.J. McNeil and E.G. Cravalho (eds.) (Boston: Auburn House Publishing Co., 1982).

Knaus, W.A., and Wagner, D.P., "Intensive Treatment for the Elderly: Comment," letter to the editor, J.A.M.A. 47:3185, 1982.

Knaus, W.A., Wagner, D.P., Draper, E.A., "The Value of Measuring Severity of Disease in Clinical Research on Acutely Ill Patients," J. Chron. Dis. 37:455, 1984.

Knaus, W.A., Wagner, D.P., Draper, E.A., "Relationship Between Acute Physiologic Derangement and Risk of Death," J. Chron. Dis. 38:295, 1985.

Knaus, W.A., Wagner, D.P., Draper, E.A., et al., "The Range of Intensive Care Services Today," J.A.M.A. 246(23):2711, 1981a.

Knaus, W.A., Wagner, D.P., Draper, E.A., et al., "Disease Scoring System in Intensive Care," Lancet, p. 1089, Nov. 5, 1983.

Knaus, W.A., Zimmerman, J.E., Wagner, D.P., et al., "APACHE - Acute Physiology and Chronic Health Evaluation: A Physiologically Based Classification System," Crit. Care Med. 9:591-597, 1981b.

Kornfeld, D.S., "Psychiatric View of the Intensive Care Unit," Brit. Med. J. 1:108, 1969.

Le Gall, J.R., Brun-Buisson, C., Trunet, P., et al., "Influence of Age, Previous Health Status, and Severity of Acute Illness on Outcome from Intensive Care," Crit. Care Med. 10(9):575, 1982.

Le Gall, J.R., Loirat, P., Alperovitch, A., et al., "A Simplified Acute Physiologic Score for ICU Patients," Crit. Care Med. 12:975, 1984.

Lemeshow, S., and Hosmer, D.W., "A Review of Goodness of Fit Statistics for Use in the Development of Logistic Regression Models," Am. J. Epidemiol. 115:92, 1982.

Lemeshow, S., Pastides, H., Avrunin, J.S., et al., "Applications of Microcomputer Spreadsheet Packages as Adjuncts to Multiple Logistic Regression Analysis,"Am. J. Epidemiol. 122:710, 1985.

Lemeshow, S., Teres, D., Avrunin, J.S., et al., "A Comparison of Models to Predict Mortality of Intensive Care Unit Patients," submitted for publication.

Lemeshow, S., Teres, D., Pastides, H., et al., "A Method for Predicting Survival and Mortality of ICU Patients Using Objectively Derived Weights," Crit. Care Med. 13:519, 1985.

Lepore, M.J., and Grace, W.J., "Role of the Intensive Care Unit in Gastroenterology," Am. J. Gastro. 51:493, 1969.

Levenson, S.A., List, N.D., Zaw-Win, et al., "Ethical Considerations in Critical and Terminal Illness in the Elderly," J. Am. Geriatr. Soc. 29:563, 1981.

Levy, D.E., Bates, D., Cardonna, J.J., et al., "Prognosis in Nontraumatic Coma," Ann. Intern. Med. 94:293, 1981.

Levy, D.E., Caronna, J.J., Singer, B.H., et al., "Predicting Outcome from Hypoxic-Ischemic Coma," J.A.M.A . 253:1420, 1985.

Levy, P.S., Goldberg, J.J., Rothrock, J., "The Revised Estimated Survival Probability Index of Trauma Severity," Public Health Reports 97(5):452, 1982.

Lidz, C.W., Meisel, A., Osterweis, M., et al., "Barriers to Informed Consent," Ann. Intern. Med. 99:539, 1983.

Linn, B.S., "Costs of Inpatient Burn Care," in "Critical Issues in Medical Technology," B.J. McNeil and E.G. Cravalho (eds.) (Boston, MA: Auburn House Publishing Co., 1982).

Lo, B., and Jonsen, A.R., "Clinical Decisions To Limit Treatment," Ann. Intern. Med. 93:764, 1980.

Loirat, P., Gayraud, M., Rigattieri, S., et al., "Comparison of Three Severity Score Indexes in Acute Hemorrhagic Pancreatitis," Intensive Care Med. 9:236, 1983.

Longstreth, W.T., Jr., Diehr, P., Inui, T.S., "Prediction of Awakening After Out-Of-Hospital Cardiac Arrest," N. Engl. J. Med. 308(23):1378, 1983.

Luria, M.H., Knoke, J.D., Margolis, R.M., "Acute Myocardial Infarction: Prognosis after Recovery," Ann Intern. Med. 85(5):561, 1976.

Maloney, T.W., Rogers, D.E., "Medical Technology - A Different View of the Contentious Debate Over Costs," N. Engl. J. Med. 301(26):1413, 1979.

Manton, K.G., "Changing Concepts of Morbidity in the Elderly Population," Milbank Mem. Fund Q. 60(2):183, 1982.

Manton, K.G., and Soldo, B.S., "Dynamics of Health Changes in the Oldest Old: New Perspectives and Evidence," Milbank Mem. Fund Q. 63(2):201, 1985.

Massachusetts General Hospital, Critical Care Committee, "Optimum Care for Hopelessly Ill Patients," N. Engl. J. Med. 295(7):362, 1976.

Mayer, T., Walker, M.L., Clark, P., "Further Experience with the Modified Abbreviated Injury Severity Scale," Journal of Trauma 24(1):31, 1984.

McCleave, D.J., Gilligan, J.E., Worthley, L.I.G., "The Role and Function of an Australian Intensive Care Unit," Crit. Care Med. 5(5):245, 1977.

McKegney, F.P., "The Intensive Care Syndrome: The Definition, Treatment and Prevention of a New Disease of Medical Progress," Conn. Med. 30(9):633, 1966.

McNeil, B.J. and Cravalho, E.G. (eds.) "Critical Issues in Medical Technology" (Boston, MA: Auburn House Publishing Co., 1982).

McNeil, B.J., and Hanley, J.A., "Statistical Approaches to Clinical Predictions," editorial, N. Engl. J. Med. 304(21):1292, 1981.

McPeek, B., Gilbert, J.P., Mosteller, F., "The Clinician's Responsibility for Helping To Improve the Treatment of Tomorrow's Patients," N. Engl. J. Med. 302(11):630, 1980.

Meakins, J.L., Solomkin, J.S., Allo, M.D., et al., "A Proposed Classification of Intra-Abdominal Infections. Stratification of Etiology and Risk for Future Therapeutic Trials," Arch. Surg. 119:1372, 1984.

Mechanic, D., "Approaches To Controlling the Costs of Medical Care: Short-Range and Long-Range Alternatives," N. Engl. J. Med. 298(5):249, 1978.

Mechanic, D., "Cost Containment and The Quality of Medical Care: Rationing Strategies in an Era of Constrained Resources," Milbank Mem. Fund Q. 63(3):453, 1985.

Micetich, K.C., Steinecker, P.H., Thomasma, D.C., "Are Intravenous Fluids Morally Required for a Dying Patient?" Arch. Intern. Med. 143:975, 1983.

Minaker, K.L., and Rowe, J., "Health and Disease Among the Oldest Old: A Clinical Perspective," Milbank Mem. Fund Q. 63(2):324, 1985.

Moore, F.D., and Zook, C.J., "High-Cost Users of Medical Care," N. Engl. J. Med. 302(18):996, 1980.

Morgan, A., Daly, C., Murawsi, B.J., "Dollar and Human Costs of Intensive Care," J. Surg. Res. 14(5):441, 1973.

Morray, J.P., Tyler, D.C., Jones, T.K., "Coma Scale for Use in Brain-Injured Children," Crit. Care Med. 12(12):1018, 1984.

Morreim, E.H., "The MD and the DRG," Hastings Cen Rep 15(3):30, 1985.

Morton, J.R., and Tolan, K.M., "Activity Level and Employment Status after Coronary Bypass Surgery," Am. J. Surg. 143:417, 1982.

Mulley, A.G., Thibault, G.E., Hughes, R.A., et al., "The Course of Patients With Suspected Myocardial Infarction: The Identification of Low-Risk Patients for Early Transfer From Intensive Care," N. Engl. J. Med. 302(17):943, 1980.

Mullin, R.L., "Diagnosis-Related Groups and Severity: ICD-9-CM, The Real Problem," J.A.M.A. 254(9):1208, 1985.

Murata, G.H., and Ellrodt, A.G., "Medical Intensive Care in a Community Teaching Hospital," West. J. Med. 136(5):462, 1982.

Myers, L.P., and Schroeder, S.A., "Physician Use of Services for the Hospitalized Patient: A Review, With Implications for Cost Containment," Milbank Mem. Fund Q./Health & Society 59:481, 1981.

Myers, L.P., Schroeder, S.A., Chapman, S.A., et al., "What's So Special About Special Care?" Inquiry 21:113, 1984.

Nadelson, T., "Psychiatric Aspects of Intensive Care of Critically Ill Patients," in "Intensive Care," J.J. Skillman (ed.) (Boston: Little, Brown & Co., 1975).

Nahum, L.H., "Madness in the Recovery Room from Open-Heart Surgery, or 'They Keep Waking Me Up,' " editorial, Conn. Med. 29:771, 1965.

Narayan, R.K., Greenberg, R.P., Miller, D., et al., "Improved Confidence of Outcome Prediction in Severe Head Injury. A Comparative Analysis of the Clinical Examination, Multimodality Evoked Potentials, CT Scanning, and Intracranial Pressure," J. Neurosurg. 54:751, 1981.

National Institutes of Health Consensus Development Conference Summary: Critical Care Medicine. Office of Medical Applications Research, NIH, US Dept. of Health and Human Services, Vol. 4, No. 6,1983.

Nelson, L., "Questions of Age - Doctors Debate Right to Stop 'Heroic' Effort to Keep Elderly Alive," The Wall Street Journal, Sept. 7:1(col 1), 1982.

Nelson, W.R., McMurtry, R.Y., Brooke, J., et al., "Application of Statistical Techniques for the Purpose of Patient Management," Crit. Care Med.; pre-publ. manuscript.

Neu, S., and Kjellstrand, C.M., "Stopping Long Term Dialysis," N. Engl. J. Med. 314(1):14, 1986.

Nightingale, F., "Notes on Hospitals," 3d Ed. (Longman, Green, Longman, Roberts & Green, p. 89, 1863).

NIH Consensus Panel, NIH Consensus Development Conference on Critical Care Medicine, Crit. Care Med. 11(6):466, 1983.

Norris, R.M., Brandt, P.W.T., Caughey, D.E., "A New Coronary Prognostic Index," Lancet 274, February 8, 1969.

Northey, D., Adess, M.L., Hartsuck, J.M., et al., "Microbial Surveillance in a Surgical Intensive Care Unit," Surgery 139:321, 1974.

Nunn, J.F., Milledge, J.S., Singaraya, J., "Survival of Patients Ventilated in an Intensive Therapy Unit," Brit. Med. J. 1:1525, 1979.

Office of Technology Assessment, U.S. Congress, "The Implications of Cost-Effectiveness Analysis of Medical Technology," OTA-H-126 (Washington, DC: U.S. Government Printing Office, August 1980).

Office of Technology Assessment, U.S. Congress, "Diagnosis Related Groups (DRGs) and the Medicare Program: Implications for Medical Technology," OTA-TM-H-17 (Washington, DC: U.S. Government Printing Office, July 1983).

Office of Technology Assessment, U.S. Congress, "Health Technology Case Study #24: Variations in Hospital Length of Stay: Their Relationship to Health Outcomes," OTA-HCS-24 (Washington, DC: U.S. Government Printing Office, August 1983).

Office of Technology Assessment, U.S. Congress, "Medical Technology and Costs of the Medicare Program," OTA-H-227 (Washington, DC: U.S. Government Printing Office, July 1984).

Parno, J.R., Teres, D., Lemeshow, S., et al., "Hospital Charges and Long-Term Survival of ICU Versus Non-ICU Patients," Crit. Care Med. 10(9):569, 1982.

Parno, J.R., Teres, D., Lemeshow, S., et al., "Two-Year Outcome of Adult Intensive Care Patients," Medical Care 22(2):167, February 1984.

Parrillo, J.E., and Ayres, S.M. (eds.), "Major Issues in Critical Care Medicine" (Baltimore, MD: Williams & Wilkins, 1984).

Patchen-Dillinger, E., Wertz, M., Meakins, J.L., et al., "Surgical Infection Stratification System for Intra-abdominal Infection," Arch. Surg. 120:21, 1985.

Pearlman, R.A., Inui, T.S., Carter, W.B., "Variability in Physician Bioethical Decision-Making: A Case Study of Euthansia," Ann. Intern. Med. 97:420, 1982.

Pessi, T.T., "Experiences Gained in Intensive Care of Surgical Patients: A Prospective Clinical Study of 1,001 Consecutively Treated Patients in a Surgical Intensive Care Unit," Ann. Chir. Gynecol. Fenn. 62:Suppl. 185:3, 1973.

Petty, T.L., "Don't Just Do Something - Stand There," Arch. Intern. Med. 139:920, 1979.

Petty, T.L., Lakshminarayan, S., Sahn, S.A., et al., "Intensive Respiratory Care Unit: Review of Ten Years Experience," J.A.M.A. 34:233, 1975.

Petty, T.L., Nett, L.M. "The Respiratory Care Department," in "Intensive & Rehabilitative Care," 2d Ed. (Philadelphia: Lea & Febiger, 1974).

Piettre, A., "Aspects of Economics, Ethics and Civilization," Intensive Care Med. 3:253, 1979.

Piper, K.W., and Griner, P.F., "Suicide Attempts With Drug Overdose; Outcomes of Intensive vs. Conventional Floor Care," Arch. Intern. Med. 134:703, 1974.

Pitner, S.E., and Mance, C.J., "An Evaluation of Stroke Intensive Care: Results in a Municipal Hospital," Stroke 4:737, 1973.

Pius XII, "The Prolongation of Life," The Pope Speaks, Vatican City, 1958.

Platt, R., Medical Director of Bronx Municipal Hospital, personal communication, July 8, 1983.

Plunkett, O., comments on Intensive Care Units in Section of Anaesthetics, Proc. Roy. Soc. Med. 59:1293, 1966.

Policy Analysis Inc., Evaluation of Effects of Certificate-of-Need Programs, prepared for the Human Resources Administration, U.S. Department of Health and Human Services, contract No. 231-77-0114, 1981.

Pozen, M.W., D'Agostino, R.B., Mitchell, J.B., et al., "The Usefulness of a Predictive Instrument to Reduce Inappropriate Admissions to the Coronary Care Unit," Ann. Intern. Med. 92:238, 1980.

Pozen, M.W., D'Agostino, R.B., Selker, H.P., et al., "A Predictive Instrument to Improve Coronary Care Unit Admission Practices in Acute Ischemic Heart Disease: A Prospective Multicenter Clinical Trial," N. Engl. J. Med. 310(120):1273, 1984.

President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, "Making Health Care Decisions" (Washington, DC: U.S. Government Printing Office, 1982).

President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, "Deciding To Forego Life-Sustaining Treatment: Ethical, Medical, and Legal Issues in Treatment Decisions" (Washington, DC: U.S. Government Printing Office, 1983).

Preston, G.A., Larson, E.L. Stamm, W.E., "The Effect of Private Isolation Rooms on Patient Care Practice, Colonization and Infection in an Intensive Care Unit," Am. J. Med. 70:641, 1981.

Rabkin, M.T., Gillerman, G., Rice, N.R., "Orders Not To Resuscitate," N. Engl. J. Med. 295(7):364, 1976.

Ranson, J.H.C., Rifkind, K.M., Roses, D.F., et al., "Prognostic Signs and the Role of Operative Management in Acute Pancreatitis," Surgery, Gynecology and Obstetrics 139:69, 1974.

Reichel, W., "The Continuity Imperative," editorial, J.A.M.A. 246(18):2065, 1981

Relman, A.S., "Intensive Care Units: Who Needs Them?" N. Engl. J. Med. 302(17):965, 1980.

Rescher, N., "The Allocation of Exotic Medical Lifesaving Therapy," Ethics 79(3):173, 1969.

Rice, D.P., and Feldman, J.J., "Living Longer in the United States: Demographic Changes and Health Needs of the Elderly," Milbank Mem. Fund Q. 61(3):362, 1983.

Robertson, J.A., "Legal Aspects of Withholding Medical Treatment From Handicapped Children," Ch. 22 in "Legal and Ethical Aspects of Treating Critically and Terminally Ill Patients," A.E. Doudera and J.D. Peters (eds.) (Ann Arbor, MI: Association of University Programs in Health Administration, 1982).

Robin, E.D., "A Critical Look at Critical Care," guest editorial, Crit. Care Med. 11(2):144, 1983.

Robinson, D., Abramson, N.S., Grenvik, A., et al., "Medicolegal Standards for Critical Care," Crit. Care Med. 8:524, 1980.

Robinson, J.S., comments on Intensive Care Units in Section of Anaesthetics, Proc. Roy. Soc. Med. 59:1293, 1966.

Rodman, G.H., Etling, T., Civetta, J.M., et al., "How Accurate Is Clinical Judgment?" Crit. Care Med. 6:127 (abstract), 1978.

Roe, B.B., "The UCR Boondoggle: A Death Knell for Private Practice," N. Engl. J. Med. 305(1):41, 1981.

Rogers, R.M., Weiler, C., Ruppenthal, B., "Impact of the Respiratory Intensive Care Unit in Survival of Patients With Acute Respiratory Failure," Chest 77:501, 1972.

Rose, H.D., and Babcock, J.B., "Colonization of Intensive Care Unit Patients With Gram-Negative Bacilli," Am. J. Epidemiol. 101:495, 1975.

Russell, L.B., "Intensive Care," ch. 3 in "Technology in Hospitals: Medical Advances and Their Diffusion" (Washington, DC: The Brookings Institute, 1979).

Russell, L.B., "The Role of Technology Assessment in Cost Control," in "Critical Issues in Medical Technology," B.J. McNeil and E.G. Cravalho (eds.) (Boston: Auburn House Publishing Co., 1982).

Sacco, W.J., Champion, H.R., Stega, M., "Trauma Care Evaluation: Emergency Department and Intensive Care Unit. Implementing the Evaluation Program," (Baltimore, MD: University Park Press, 1984).

Safar, P., "The Critical Care Medicine Continuum From Scene to Outcome," Ch. 7 in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayres (eds.) (Baltimore, MD: Williams & Wilkins, 1984).

Safar, P., Dekornfeld, T.J., Pearson, J.M., et. al., "The Intensive Care Unit," Anaesthesia 16(3): 275, 1961.

Safar, P., and Grenvik, A., "Critical Care Medicine: Organizing and Staffing Intensive Care Unit," Chest 59(5):535, 1971.

Safar, P., and Grenvik, A., "Organization and Physician Education in Critical Care Medicine," Anesthesiology 47:82, 1977.

Salkever, D.S., and Bice, T.W., "The Impact of Certificate-of-Need Controls on Hospital Investment," Milbank Mem. Fund Q./Health & Society 185, 1976.

Sanders, C.A., "Hospital Management of Critical Care - I," presentation at the National Institute of Health Consensus Development Conference, Critical Care Medicine, March 8, 1983.

Savageau, J.A., Stanton, B.A., Jenkins, C.D., et al., "Neuropsychological Dysfunction Following Elective Cardiac Operation: II. A Six-Month Reassessment," J. Thoracic and Cardiovascular Surg. 84(4):595, 1982.

Scheffler, R.M., Knaus, W.A., Wagner, D.P., et al., "Severity of Illness and the Relationship Between Intensive Care and Survival," Am. J. Publ. Health 725:449, 1981.

Schelling, T.C., "The Life You Save May Be Your Own," in "Problems in Public Expenditure Analysis," S. Chase (ed.) (Washington, DC: The Brookings Institute, 1968).

Schmidt, C.D., Elliott, C.G., Carmelli, D., et al., "Prolonged Mechanical Ventilation for Respiratory Failure: A Cost-Benefit Analysis," Crit. Care Med. 11(6):407, 1983.

Schoenfeld, M.R., "Terror in the ICU," Forum 1:14, 1978.

Schroeder, H.G., "Psycho-Reactive Problems of Intensive Therapy," Anaesthesia 26(1):28, 1971.

Schroeder, S.A., Showstack, J.A., Robert, H.E., "Frequency and Clinical Description of High-Cost Patients in 17 Acute-Care Hospitals," N. Engl. J. Med. 300:1306, 1979.

Schroeder, S.A., Showstack, J.A., Schwartz, J., "Survival of Adult High-Cost Patients, Report of a Follow-Up Study From Nine Acute-Care Hospitals," J.A.M.A. 245(14):1446, 1981.

Schwartz, S., and Cullen, D.J., "How Many Intensive Care Beds Does Your Hospital Need?" Crit. Care Med. 9(9):625, 1981.

Shapiro, A.R., "The Evaluation of Clinical Prediction," N. Engl. J. Med. 296(26):1509, 1977.

Shoemaker, W.C., "Effectiveness of the Intensive Care Unit for Management of Accidental, Traumatic and Hemorrhagic Shock," Ch. 9 in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayers (eds.) (Baltimore, MD: Williams & Wilkins, 1984).

Shoemaker, W.C., Appel, P.L., Bland, R., et al., "Clinical Trial of an Algorithm for Outcome Prediction in Acute Circulatory Failure," Crit. Care Med. 10(6):390, 1982.

Shoemaker, W.C., Thompson, L., Holbrook, P. (eds.), "Textbook on Critical Care Medicine" (Philadelphia: W.B. Saunders, 1983).

Shragg, T.A., and Albertson, T.E., "Moral, Ethical and Legal Dilemmas in the Intensive Care Unit," Crit. Care Med. 12:62, 1984.

Shubin, H., and Weil, M.H., "Touchstones in Critical Care Medicine - An Introduction," Crit. Care Med. 21:281, 1974.

Siegel, J.H., Cerra, F.B., Moody, E.A., et al., "The Effect on Survival of Critically Ill and Injured Patients of ICU Teaching Service Organized About a Computer-Based Physiologic CARE System," J. Trauma 20(7):558, 1980.

Siegler, M., "Pascal's Wager and the Hanging of Crepe," N. Engl. J. Med. 293(17):853, 1975.

Siegler, M., "Critical Illness: The Limits of Autonomy," Hastings Cen. Rep. 7, 1977.

Singer, D., Carr, P., Mulley, A., et al., "Rationing Intensive Care - Physician Responses to a Resource Shortage," N. Engl. J. Med. 309(19):1155, 1983.

Skidmore, F.D., "A Review of 460 Patients Admitted to the Intensive Therapy Unit of a General Hospital Between 1965 and 1969," Brit. J. Surg. 60:1, 1973.

Skillman, J.J. (ed.), "Intensive Care" (Boston: Little, Brown & Co., 1975).

Skillman, J.J., "Terminal Care in Patients With Chronic Lung Disease," Arch. Intern. Med. 139, 1979.

Skinner, E.R., Barnett, G.O., Singer, D.E., et al., "The Use of Logistic Regression in Diagnostic and Prognostic Prediction in a Medical Intensive Care Unit," Proceedings of the 4th Annual Symposium on Computer Applications in Medical Care, November 2-5, 1980.

Smits, H.L., "The PSRO in Perspective," N. Engl. J. Med. 305(5):253, 1981.

Snyder, J.V., McGuirk, M., Grenvik, A., et al., "Outcome of Intensive Care - An Application of a Predictive Model," Crit. Care Med. 9(8):598, 1981.

Society of Critical Care Medicine, Committee on Training Guidelines, P.M. Winter (Chm.), "Guidelines for Training of Physicians in Critical Care Medicine," Crit. Care Med. 1(1):39, 1973.

Soldo, B.J., and Manton, K.G., "Health Status and Service Needs of the Oldest Old: Current Patterns and Future Trends," Milbank Mem. Fund Q. 63(2):286, 1985.

Soler, N.G., Bennett, M.A., Fitzgerald, M.G., et al., "Intensive Care in the Management of Diabetic Ketoacidosis," Lancet 4:951, 1973.

Spagnolo, S.V., Hershberg, P.I., Zimmerman, H.J., "Medical Intensive Care Unit: Mortality Rate Experience in Large Teaching Hospital," N.Y. State J. Med. 73:754, 1973.

Spitzer, W.O., Dobson, A.J., Hall, J., et al., "Measuring the Quality of Life of Cancer Patients: A Concise QL-Index for Use by Physicians," Journal of Chronic Diseases 34(12):585, 1981.

Stanley, B., "Senile Dementia and Informed Consent," Behavioral Sciences and the Law 1(4):57, 1983.

Stanley, B., Guido, J., Stanley, M., et al., "The Elderly Patient and Informed Consent: Empirical Findings," J.A.M.A. 252(10):1302, 1984.

Stanley, B., and Stanley, M., "Testing Competency in Psychiatric Patients," I.R.B. 4(8):1, 1982.

Steel, K., Gertman, P.M., Crescenzi, C., et al., "Iatrogenic Illness on a General Medical Service at a University Hospital," N. Engl. J. Med. 304(11): 638, 1981.

Stern, R.S., and Epstein, A.M., "Institutional Responses to Prospective Payment Based on Diagnosis-Related Groups," N. Engl. J. Med. 312(10):621, 1985.

Stewart, A.L., Ware, J.E., Jr., Brook, R.H., "Advances in the Measurement of Functional Status: Construction of Aggregate Indexes," Medical Care 19(5):473, May 1981.

Stoughton, W.V., "Medical Costs and Technology Regulation: The Pivotal Role of Hospitals," in "Critical Issues in Medical Technology," B.J. McNeil and E.G. Cravalho (eds.) (Boston: Auburn House Publishing Co., 1982).

Strauss, M.J., LoGerfo, J.P., Yeltatzie, J.A., et al., "Rationing of Intensive Care Unit Services: An Everyday Occurrence," J.A.M.A. (forthcoming 1986).

Sullivan, R., "Court in Jersey Forbids Removing Feeding Tube From Terminally Ill," New York Times July 9:1 (col. 1), 1983.

Swan, H.J.C., "Invasive Hemodynamic Monitoring in Critical Care Units," Ch. 12 in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayers (eds.) (Baltimore, MD: Williams & Wilkins, 1984).

Sweet, S.J., Glenney, C.U., Fitzgibbons, J.P., et al., "Synergistic Effect of Acute Renal Failure and Respiratory Failure in the Surgical Intensive Care Unit," Am. J. Surg. 141:492, 1981.

Tagge, G.F., Adler, D., Bryan-Brown, C.W., "Relationship of Therapy to Prognosis in Critically Ill Patients," Crit. Care Med. 2(2):61, 1974.

Tagge, G.F., Salness, G., Thams, J., et al., "Experience With a Multi-disciplinary Critical Care Center in a Community Hospital," Crit. Care Med. 3(6):231, 1975.

Tait, M., and Winslow, G., "Beyond Consent: The Ethics of Decision Making in Emergency Medicine," West J. Med. 126(2):156, 1977.

Teasdale, G., and Jennett, B., "Assessment of Coma and Impaired Consciousness: A Practical Scale," Lancet 2:81, 1974.

Teplick, R., Caldera, D.L., Gilbert, J.P., et al., "Benefit of Elective Intensive Care Admission After Certain Operations," Anesth. Analg. 62:572, 1983.

Teres, D., Brown, R.B., Lemeshow, S., "Predicting Mortality of Intensive Care Unit Patients: The Importance of Coma," Crit. Care Med. 10(2):86, 1982.

Teres, D., Lemeshow, S., Avrunin, J.S., et al., "A Validation of an ICU Admission Model for Predicting Hospital Mortality," submitted for publication.

Thibault, G.E., "The Medical Intensive Care Unit: A Five-Year Perspective," Ch. 2 in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayers (eds.) (Baltimore, MD: Williams & Wilkins), 1984.

Thibault, G.E., Mulley, A.G., Barnett, C.O., et al., "Medical Intensive Care: Indications, Interventions, and Outcomes," N. Engl. J. Med. 302(17):938, 1980.

Thomas, L., "Notes of a Biology-Watcher: The Technology of Medicine," N. Engl. J. Med. 285(24):1366, 1971.

Tierney, W.M., Roth, B.J., Psaty, B., et al., "Predictors of Myocardial Infarction in Emergency Room Patients," Crit. Care Med. 13(7):526, July 1985.

Tomlin, P.J., "Intensive Care-Medical Audit," Anaesthesia 33:710, 1978.

Turnbull, A.D., Carlon, G., Baron, R., et al., "The Inverse Relationship Between Cost and Survival in the Critically Ill Cancer Patients," Crit. Care Med. 7(1):20, 1979.

Turnbull, A.D., Goldmeir, P., Silverman, D., et al., "The Role of an Intensive Care Unit in a Cancer Center: An Analysis of 1035 Critically Ill Patients Treated for Life-Threatening Complications," editorial, Cancer 37:82, 1976.

U.S. Department of Commerce, Bureau of the Census, "State and Metropolitan Area Data Book 1982" (Washington, DC: U.S. Department of Commerce, 1982).

U.S. Department of Health and Human Services, National Institutes of Health, Consensus Development Conference statement, "Supportive Therapy in Burn Care," November, 1978.

U.S. Department of Health and Human Services, Health Care Financing Administration, Office of Research and Demonstration, Bureau of Data Management and Strategy, "List of Diagnosis Related Groups (DRGs) With Relative Values, Average Length of Stay (ALOS), and Percent of Adjusted Charges Per Discharge for Ancillary Services," 1979 data.

U.S. Department of Health and Human Services, "Report to Congress: Hospital Prospective Payment for Medicare" (Washington, DC: U.S. Department of Health and Human Services, December, 1982).

U.S. Department of Health and Human Services, National Institutes of Health, Consensus Development Conference Statement, "Critical Care Medicine," March, 1983.

U.S. Department of Health and Human Services, Health Care Financing Administration, Office of Research and Demonstration, Bureau of Data Management and Strategy, "20 Percent Sample Discharges by Diagnosis Related Group Adjusted Sample," June 21, 1983.

U.S. Department of Health and Human Services, Health Care Financing Administration, Office of Research and Demonstration, Bureau of Data Management and Strategy, "Routine and Special Care Arithmetic Mean Length of Stay for Outlier and Non-Outlier Cases," Oct. 27, 1983.

Vanholder, R., and Colardyn, F., "Prognosis of Intensive Care Patients: Correlation of Diagnosis and Complications to Patient Outcome," Acta Clinica Belgica 35(5):279, 1980.

Veatch, R.M., "A Theory of Medical Ethics" (New York: Basic Books, 1981).

Wagner, D.P., Draper, E.A., Campos, R.A., et al., "Initial International Use of APACHE," Med. Decis. Making 4:297, 1984.

Wagner, D.P., Knaus, W.A., Draper, E.A., "Statistical Validation of a Severity of Illness Measure," Am. J. Public Health 73:878, 1983.

Wagner, D.P., Knaus, W.A., Draper, E.A., "Physiologic Abnormalities and Outcome from Acute Disease: Evidence for a Predictable Relationship," to appear in Arch. Intern. Med.

Wagner, D.P., Knaus, W.A., Draper, E.A., et al., "Identification of Low-Risk Monitor Patients within a Medical-Surgical Intensive Care Unit," Medical Care 21:425, 1983.

Wagner, D.P., Wineland, T.D., Knaus, W.A., "The Hidden Costs of Treating Severely Ill Patients: Charges and Resource Consumption in an Intensive Care Unit," Health Care Finan. Rev. 5(1):81, 1983.

Wallace-Barnhill, G.L., Roth, M.D., Armstrong, C.J., et al., "Health Care Law Update: Legal Protection for Critical Care Physicians: State of the Art in Termination of Life Support and Living Will Legislation," Crit. Care Med. 12:56, 1984.

Wanzer, S.H., Adelstein, S.J., Cranford, R.E., et al., "The Physician's Responsibility Toward Hopelessly Ill Patients," N. Engl. J. Med. 310(7):455, 1984.

Wasson, J.H., Sox, H.C., Neff, R.K., et al., "Clinical Prediction Rules: Applications and Methodological Standards," N. Engl. J. Med. 313:793, 1985.

Weil, M.H., "The Society of Critical Care Medicine, Its History and Its Destiny," Crit. Care Med. 1(1):1, 1973.

Weil, M.H., and Rackow, E.A., "Critical Care Medicine - Caveat Emptor," Arch. Intern. Med. 143:1391, 1983.

Weinberg, S.L., "Intermediate Coronary Care: Observations on the Validity of the Concept," Chest 73:154, 1978.

Weinstein, M.C., and Fineberg, H.V., "Clinical Decision Analysis," (Philadelphia: W.B. Saunders, 1980).

Weiser, B., "As They Lay Dying," Washington Post [April 17: Part I, 1 (col. 1), 1983; April 18: Part II, 1 (col. 2), 1983; April 19: Part III, 1 (col. 1), 1983; April 20: Part IV, 1 (col. 4), 1983; April 21: Part V, 1 (col. 5), 1983].

Wennberg, J., Gittelsohn, A., "Small Area Variations in Health Care Delivery," Science, 182:1102, 1973.

Wennberg, J.E., McPherson, K., Caper, P., "Will Payments Based on Diagnosis-Related Groups Control Hospital Costs?" N. Engl. J. Med. 311(5):295, 1984.

Westaby, S., Sapsford, R.N., Bentall, H.M., "Return to Work and Quality of Life After Surgery for Coronary Artery Disease," Brit. Med. J. 2:1028, October 1979.

Williams, S.V., "Can Randomized Trials of Intensive Care Meet Ethical Standards?" in "Critical Issues in Medical Technology," B.J. McNeil and E.G. Cravalho (eds.) (Boston: Auburn House Publishing Co., 1982).

Williams, S.V., "A Model for Predicting Intensive Care Bed Needs," Crit. Care Monitor p. 1, April 1984.

Wilson, J.B., "Medical Dilemmas in Terminal Care," in "Death by Decision" (Philadelphia: Westminster Press, 1975).

Wilson, R.F., "Development and Cost Effectiveness of Surgical Intensive Care Units," in Crit. Care Med., program abstract from the National Institutes of Health Consensus Development Conference, March,1983.

Winkenwerder, W., Jr., "Ethical Dilemmas for House Staff Physicians," J.A.M.A. 254(24):3454, 1985.

Young, D.B., and Saltman, R.B., "The Hospital Power Equilibrium," (Baltimore MD, Johns Hopkins Press, 1985).

Young, W.R., "It's a Miracle That We Save Any of Them," Life Magazine, December, 1966.

Young, W.W., "Incorporating Severity of Illness and Comorbidity in Case-Mix Measurement," Health Care Fin. Rev., Ann. Suppl. 23, November 1984.

Young, W.W., Swinkola, M.S., Zorn, D.M., "The Measurement of Hospital Case Mix," Medical Care XX(5):501, 1982.

Youngner, S.J., Lewandowski, W., McClish, D.K., et al., " 'Do Not Resuscitate' Orders: Incidence and Implications in a Medical Intensive Care Unit," J.A.M.A. 253(1):54, 1985.

Zimmerman, J.E., "Administrative Structure of a Critical Care Unit," ch. 25 in "Major Issues in Critical Care Medicine," J.E. Parrillo and S.M. Ayers (eds.) (Baltimore, MD: Williams & Wilkins, 1984).

Zimmerman, J.E., Knaus, W.A., Sharpe, S.M., et al., "The Use and Implications of Do Not Resuscitate Orders in Intensive Care Unit," J.A.M.A. 255(3):351, 1986.

Zook, C.J., Moore, F.D., "High-Cost Users of Medical Care," N. Engl. J. of Med. 302(18):996, 1980.

Table 1. Summary of ICU Statistics

Distribution of ICU Beds in Short-Term, Non-Federal Hospitals, by Size of Hospital, 1982

Hospital bed size	Total hospital beds	Percent of total	Total ICU/CCU beds	Percent of total
< 100	146,706	14.5	5,889	9.9
100-199	195,425	19.3	10,677	17.9
200-299	179,312	17.7	11,302	18.9
300-399	144,012	14.2	9,312	15.6
400-499	120,682	11.9	7,692	12.9
> 500	229,043	22.6	14,826	24.8
Total	1,015,180	99.3	59,698	100.0

SOURCE: American Hospital Association, *Hospital Statistics*, 1983 edition.

ICU/CCU Beds as Percent of Total Beds by Hospital Size for Short-Term Non-Federal Hospitals, 1982

Hospital bed size	Percent ICU/CCU beds
< 100	4.0
100-199	5.5
200-299	6.3
300-399	6.5
400-499	6.4
> 500	6.5
Total	5.9

SOURCE: American Hospital Association, *Hospital Statistics*, 1983 edition.

Distribution of ICU and CCU Beds, by Region, 1981

Region	Per 10,000 population	Per 100 hospital beds
New England	2.5	5.8
Middle Atlantic	2.8	5.7
South Atlantic	2.9	5.8
East North Central	3.3	6.7
East South Central	2.9	5.3
West North Central	3.2	5.0
West South Central	2.6	5.2
Mountain	2.6	6.2
Pacific	2.7	7.0
Total	2.9	5.9[a]

[a] Hospital data in this table includes Federal hospitals and specialty service short-term hospitals.

SOURCE: American Hospital Association, *Hospital Statistics*, 1982 edition; and U.S. Department of Commerce, Bureau of the Census, *State and Metropolitan Area Data Book*, 1982.

From OTA, 1984

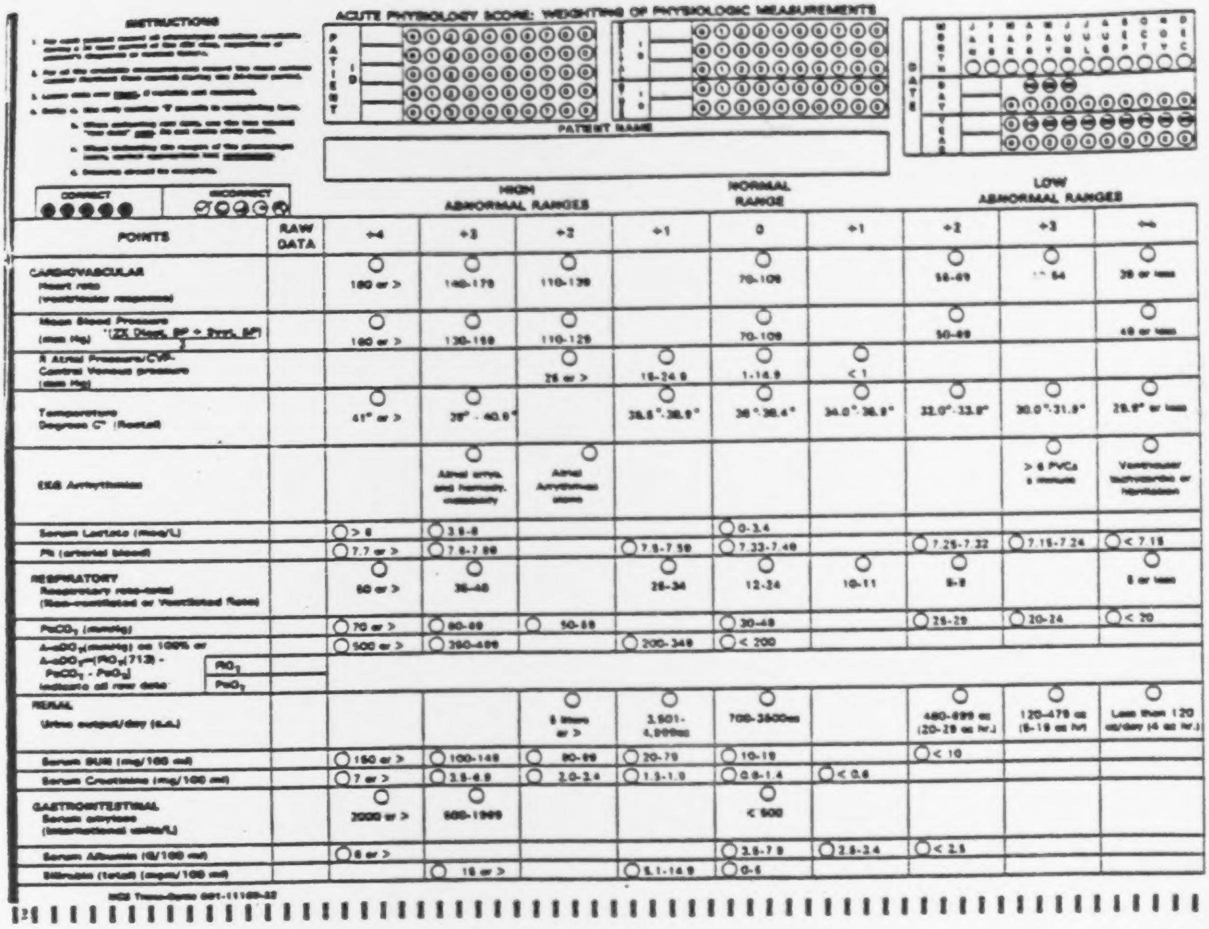
Percentage of ICU/CCU Beds in Short-Term Hospitals, by Hospital Sponsorship, 1976 and 1982

Type of hospital	Percent of hospital beds that are ICU or CCU beds	
	1976	1982
Nongovernment not-for-profit	5.0	6.2
Investor owned (for-profit)	4.4	5.4
State and local government	4.2	5.1
All non-Federal	4.7	5.9
(Federal hospitals)[a]	(3.7)	(3.4)

[a] Reporting from Federal hospitals includes hospitals other than short-term general hospitals, including long-term care facilities. Percentages of ICU/CCU in Federal hospitals are not strictly comparable to those in non-Federal hospitals.

SOURCE: American Hospital Association, *Hospital Statistics*, 1977 and 1983 editions.

Table 2. Variables in APS (Side 1 of APS Form)



ACUTE PHYSIOLOGY SCORE: WEIGHTING OF PHYSIOLOGIC MEASUREMENTS

INSTRUCTIONS

PATIENT ID

PATIENT NAME

DATE

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

CORRECT ●●●●●

INCORRECT

		HIGH ABNORMAL RANGES				NORMAL RANGE		LOW ABNORMAL RANGES		
POINTS	RAW DATA	+4	+3	+2	+1	0	+1	+2	+3	+4
CARDIOVASCULAR Heart rate (ventricular response)		○ 180 or >	○ 140-179	○ 110-139		○ 70-109		○ 55-69	○ 54	○ 39 or less
Mean Blood Pressure (mm Hg) *(2X Diast. BP + Syst. BP) / 3		○ 160 or >	○ 130-159	○ 110-129		○ 70-109		○ 50-69		○ 49 or less
R Atrial Pressure/CVP-Central Venous pressure (mm Hg)				○ 25 or >	○ 15-24.9	○ 1-14.9	○ < 1			
Temperature Degrees C° (Rectal)		○ 41° or >	○ 39° - 40.9°		○ 38.5°-38.9°	○ 36°-38.4°	○ 34.0°-35.9°	○ 32.0°-33.9°	○ 30.0°-31.9°	○ 29.9° or less
EKG Arrhythmias			○ Atrial arrhy. and hemody. unstable	○ Atrial Arrhythmias stable					○ > 6 PVCs a minute	○ Ventricular tachycardia or fibrillation
Serum Lactate (mos/L)		○ > 8	○ 3.5-8			○ 0-3.4				
Ph (arterial blood)		○ 7.7 or >	○ 7.6-7.69		○ 7.5-7.59	○ 7.33-7.49		○ 7.25-7.32	○ 7.15-7.24	○ < 7.15
RESPIRATORY Respiratory rate-total (Non-ventilated or Ventilated Rate)		○ 50 or >	○ 35-49		○ 25-34	○ 12-24	○ 10-11	○ 6-9		○ 5 or less
$PaCO_2$ (mmHg)		○ 70 or >	○ 60-69	○ 50-59		○ 30-49		○ 25-29	○ 20-24	○ < 20
A-aDO₂(mmHg) on 100% or A-aDO₂=(FIO₂(713) - PaCO₂ - PaO₂) indicate all raw data: FIO_2 / PaO_2		○ 500 or >	○ 350-499		○ 200-349	○ < 200				
RENAL Urine output/day (c.c.)				○ 5 liters or >	○ 3,501-4,999cc	○ 700-3500cc		○ 480-699 cc (20-29 cc hr.)	○ 120-479 cc (5-19 cc hr)	○ Less than 120 cc/day (4 cc hr.)
Serum BUN (mg/100 ml)		○ 150 or >	○ 100-149	○ 80-99	○ 20-79	○ 10-19		○ < 10		
Serum Creatinine (mg/100 ml)		○ 7 or >	○ 3.5-6.9	○ 2.0-3.4	○ 1.5-1.9	○ 0.6-1.4	○ < 0.6			
GASTROINTESTINAL Serum amylase (International units/L)		○ 2000 or >	○ 500-1999			○ < 500				
Serum Albumin (G/100 ml)		○ 6 or >				○ 3.5-7.9	○ 2.5-3.4	○ < 2.5		
Bilirubin (total) (mgm/100 ml)			○ 15 or >		○ 5.1-14.9	○ 0-5				

From Meakins et al., 1984

Table 2 (cont.). Variables in APS (Side 2 of APS Form)

			HIGH ABNORMAL RANGES			NORMAL RANGE	LOW ABNORMAL RANGES			
POINTS	RAW DATA	+4	+3	+2	+1	0	+1	+2	+3	+4
GASTROINTESTINAL (Cont.) ALKP-Alkaline Phosphatase-serum (international units/L)					○ > 160	○ 0-160				
SGOT (International Units/L)				○ 1500 or >	○ 100-1499	○ 0-99				
HEMATOLOGIC Hematocrit (%)		○ 60 or >		○ 50-59.9	○ 46-49.9	○ 30-45.9		○ 20-29.9		○ < 20
WBC/White Blood Count (Thousands, mm)		○ 40,000 or >		○ 20,000-39,999	○ 15,000-19,999	○ 3,000-14,999		○ 1,000-2,999		○ < 1,000
Platelets (cu. mm)				○ 1,000,000 or >	○ 600,000-999,999	○ 80,000-599,999		○ 20,000-79,999		○ < 20,000
Prothrombin (in seconds > control) no anticoagulants		○ 12 or >	○ 5-11.9	○ 3-4.9		○ 0-2.9				
SEPTIC CSF (cerebral spinal fluid)-Positive Culture		○ Yes				○ No				
Blood – Positive Culture		○ Yes				○ No				
Fungal – Positive Culture		○ Blood and/ or CSF	○ 2 sites other than blood or CSF		○ 1 site other than blood or CSF	○ None				
Anergy Skin Tests**		○ Total		○ Relative		○ None				
EKG Evidence or CPK-MB Levels Diagnostic of Acute M.I.		○ Yes				○ No				
METABOLIC Serum Calcium (mg/100 ml)		○ 16 or >		○ 14-15.9	○ 11-13.9	○ 8-10.9		○ 6.0-7.9		○ < 6
Serum Glucose (mg/100 ml)		○ 800 or >	○ 500-799		○ 250-499	○ 70-249		○ 50-69	○ 30-49	○ < 30
Serum Sodium (mmol/L)		○ 180 or >	○ 160-179	○ 155-159	○ 150-154	○ 130-149		○ 120-129	○ 111-119	○ 110 or <
Serum Potassium (mmol/L)		○ 7 or >	○ 6-6.9		○ 5.5-5.9	○ 3.5-5.4	○ 3-3.4	○ 2.5-2.9		○ < 2.5
Serum HCO_3 – (mmol/L)			○ 40 or >		○ 30-39.9	○ 20-29.9	○ 10-19.9		○ 5-9.9	○ < 5
NEUROLOGIC Glasgow Coma Score*		○ 3	○ 4-6	○ 7-9	○ 10-12	○ 13-15				
TOTAL										

* Sum of Best Eye Opening, Best Verbal, and Best Motor Responses. Scoring of responses as follows.
EYE – Open: Spontaneously (4), to verbal command (3), to pain (2); No response (1).
MOTOR – Obeys verbal command (6); Response to painful stimuli: localizes pain (5), flexion-withdrawal (4), decorticate rigidity (3), decerebrate rigidity (2); No response (1). [movement without control (4)].
VERBAL – oriented and converses (5), disoriented and converses (4), inappropriate words (3), incomprehensible sounds (2), no response (1). If intubated use clinical judgement for verbal as follows: (1) – patient generally unresponsive, (3) – patient's ability to converse in question, (5) – patient appears able to converse.

** Total Anergy – no response to all provocative skin tests including mumps and fungal.
Relative Anergy – reduced response to skin tests indicative of compromised cellular immunity.

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From Meakins et al., 1984

Table 3. Determination of Preadmission Health Status for APACHE

Qualifying questions*	Chronic health evaluation	Brief description
Did the patient have weekly visits to a physician? Was the patient unable to work because of illness? Was the patient bedridden or institutionalized because of illness? Had the patient suffered a relapse after systemic treatment for carcinoma?	D	Severe restriction of activity due to disease; includes persons bedridden or institutionalized due to illness.
Was the patient's usual daily activity limited? Did symptoms occur with mild exertion? Had the patient received treatment for neoplasm with remission or uncomplicated hemodialysis?	C	Chronic disease producing serious but not incapacitating restriction of activity.
Did the patient see a physican monthly? Did he take medication chronically? Was he mildly limited in his activity level because of illness? Had the patient had diabetes mellitus, chronic renal failure, a bleeding disorder, or chronic anemia?	B	Mild to moderate limitation of activity because of a chronic medical problem.
(Negative response to all of the above questions.)	A	Prior good health; no functional limitations.

* All answers are based on health status 3–6 months before admission.

From Knaus et al., 1981b.

Table 4. Chronic Health Evaluation Form for APACHE (Side 1)

ADMISSION AND PRE-ADMISSION HEALTH STATUS

PATIENT NAME:

PATIENT REGISTRATION INFORMATION

1. MEDICAL RECORD NUMBER	2. PATIENT ID NUMBER	3a. HOSP ID	3b. OTH ID	4. AGE
⓪ ⓪ ⓪ ⓪ ⓪ ⓪ ⓪ ⓪ ⓪	⓪ ⓪ ⓪ ⓪ ⓪	⓪ ⓪ ⓪	⓪ ⓪	⓪ ⓪
① ① ① ① ① ① ① ① ①	① ① ① ① ①	① ① ①	① ①	① ①
② ② ② ② ② ② ② ② ②	② ② ② ② ②	② ② ②	② ②	② ②
③ ③ ③ ③ ③ ③ ③ ③ ③	③ ③ ③ ③ ③	③ ③ ③	③ ③	③ ③
④ ④ ④ ④ ④ ④ ④ ④ ④	④ ④ ④ ④ ④	④ ④ ④	④ ④	④ ④
⑤ ⑤ ⑤ ⑤ ⑤ ⑤ ⑤ ⑤ ⑤	⑤ ⑤ ⑤ ⑤ ⑤	⑤ ⑤ ⑤	⑤ ⑤	⑤ ⑤
⑥ ⑥ ⑥ ⑥ ⑥ ⑥ ⑥ ⑥ ⑥	⑥ ⑥ ⑥ ⑥ ⑥	⑥ ⑥ ⑥	⑥ ⑥	⑥ ⑥
⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦ ⑦	⑦ ⑦ ⑦ ⑦ ⑦	⑦ ⑦ ⑦	⑦ ⑦	⑦ ⑦
⑧ ⑧ ⑧ ⑧ ⑧ ⑧ ⑧ ⑧ ⑧	⑧ ⑧ ⑧ ⑧ ⑧	⑧ ⑧ ⑧	⑧ ⑧	⑧ ⑧
⑨ ⑨ ⑨ ⑨ ⑨ ⑨ ⑨ ⑨ ⑨	⑨ ⑨ ⑨ ⑨ ⑨	⑨ ⑨ ⑨	⑨ ⑨	⑨ ⑨

5. SEX

Male ○
Female ○

6. RACE

White ○
Black ○
Other ○

INSTRUCTIONS:

Indicate your positive response by darkening the appropriate circle.

Note:
1. Use only number '2' pencils in completing form.
2. Darken in the appropriate circle completely – do not extend pencil marks beyond the lines of the circle.
3. Do not make any stray marks on the sheet.
4. Erasures should be complete.

Note: Do not include patients only admitted to the ICU for Administrative reasons, i.e., Hospital full, C.C.U. full, etc.

CORRECT	INCORRECT
● ● ● ● ●	

7. Patient admitted to ICU from: (Mark one)
○ Operating room
○ Recovery room
○ Emergency room
○ Other floor/unit in hospital
○ Another hospital
○ Other

8. a. Patient's primary service: (Mark one)
○ Medicine
○ Surgery

b. If surgery, what specialty service: (Mark one)
○ General
○ Thoracic
○ Neurologic
○ Urology
○ Head and neck
○ Orthopedic
○ OB/Gyn
○ Other

c. If post-operative:
1 was surgery ○ Elective or ○ Emergency
2 were there intraoperative (or recovery room) complications ○ Yes ○ No

PRIMARY INDICATION FOR ICU ADMISSION:

1. Mark the one, primary system whose failure or insufficiency necessitated the patient's admission to the ICU and ruled out treatment on a regular hospital floor. (Mark one)
○ Cardiovascular
○ Neurologic
○ Respiratory
○ Gastrointestinal*
○ Renal**
○ Metabolic
○ Hematologic

*Includes esophagus, liver, pancreas, gall bladder. **Includes genito-urinary.

2. Was there a second system also in failure? ○ No ○ Yes
3. a. Is the primary system failure/insufficiency ○ Chronic or ○ Acute
b. Was patient previously treated in ICU during this hospitalization? ○ Yes ○ No

4. PRECIPITATING FACTORS: Mark the one, primary factor from the list below that precipitated the primary system failure/insufficiency indicated above:

○ 1. Infection
○ 2. Neoplasm
○ 3. Simple trauma (relatively confined)
○ 4. Multiple trauma
○ 5. Major pelvic trauma
○ 6. Multiple long bone trauma
○ 7. Both 5 and 6
○ 8. Vascular insufficiency/embolus/ischemia
○ 9. Toxic/poisoning/chemical
○ 10. Self-intoxication (overdose)
○ 11. Cranial hemorrhage (intracerebral, subdural, subarachnoid, etc.)
○ 12. Seizure(s)
○ 13. Neuromuscular failure
○ 14. Post laminectomy (any spinal cord surgery)
○ 15. Suicide risk
○ 16. Coronary artery disease
○ 17. Valvular heart disease
○ 18. Anatomical defect/anomaly
○ 19. Pericardial disease
○ 20. Peripheral vascular disease
○ 21. Hypertension
○ 22. Congestive heart failure
○ 23. Rhythm disturbance
○ 24. Myocardial infarction
○ 25. Myocardopathy
○ 26. Drug induced shock
○ 27. Cardiogenic shock
○ 28. Septic shock/sepsis
○ 29. Hemorrhagic shock/hypovolemia
○ 30. Anaphylactic shock
○ 31. Post arrest (cardiac, respiratory)
○ 32. Allergy
○ 33. Bleeding
○ 34. Perforation/obstruction
○ 35. Coma/mental derangement (metabolic)
○ 36. Post transplant surgery
○ 37. Leukopenia/thrombocytopenia
○ 38. Coagulopathy
○ 39. Sickle cell disease (crisis)
○ 40. Electrolyte imbalance/Acid-base disturba
○ 41. Hypo/hyperthermia
○ 42. Endocrine emergency (disease)
○ 43. Obesity
○ 44. Malnutrition
○ 45. None evident
○ 46. Other

Table 4 (cont.). Chronic Health Evaluation Form for APACHE (Side 2)

HEALTH STATUS – SIX MONTHS PRIOR TO ICU ADMISSION*

This information pertains to patient's general health and not necessarily to present illness that necessitates intensive care. *Unless otherwise indicated.

A B C D

I. GENERAL HEALTH QUESTIONS

A. Therapy/Medical Attention Required (6 month prior)

(Items 1–4 are mutually exclusive)

Ⓐ .... 1 None (not needed)

2. Chronic medications/monthly medical visits or

Ⓑ .... less frequent (includes physician or nurse visits)

3. Frequently adjusted medications/weekly

Ⓓ .... medical visits or more frequent

4. Uncontrolled disease state despite frequent

Ⓓ .... visits and adjusted medication (end-stage)

B. FUNCTIONAL STATUS

(Items 1–3 are mutually exclusive)

Ⓐ .... 1. No limitations

Ⓑ ...... 2. Limited activity

Ⓓ 3. Bed-ridden

C. PRODUCTIVITY

(Items 1–4 are mutually exclusive)

Ⓐ 1 Employed full-time (includes housewife, student)

Ⓐ 2 Employed part-time

Ⓐ 3 Retired/active and unemployed

Ⓒ 4 Unemployed due to illness

II. SYSTEM SPECIFIC HEALTH QUESTIONS

A. NEUROLOGIC SYSTEM

(Items 1–3 are mutually exclusive)

Ⓐ .... 1 Fully alert

Ⓑ .... 2. Communication limited (able to convey a message)

Ⓑ .... 3. Communication inadequate (unable to convey a message)

Ⓐ .... 4. History of drug abuse per hospital medical record

Ⓐ .... 5. History of alcohol abuse per hospital medical record

6. Past episodes of confusion, transient paralysis/TIA

Ⓑ .... (transient ischemic attacks)

Ⓑ .... 7. History of documented seizures

B. RESPIRATORY SYSTEM

(Items 1–4 are mutually exclusive)

Ⓐ .... 1. No limitations

Ⓑ .... 2. Symptoms on moderate exertion

3. Symptoms on mild exertion

Ⓒ .... (less than 2 blocks)

Ⓓ .... 4. Confined to home

5. Positive smoking history (more than 20 pack years

Ⓐ .... during any time in life)

C. RENAL SYSTEM

(Items 1–4 are mutually exclusive)

Ⓐ .... 1. No symptoms/no activity restriction

2. Unable to perform only the most strenuous physical

Ⓑ .... activity

3. Unable to perform most usual daily physical

Ⓒ .... activity

4. Severe limitation of usual daily physical

Ⓓ .... activity

5. Uncomplicated maintenance dialysis

Ⓑ .... (hemo, peritoneal)

6. Complicated maintenance dialysis

Ⓓ .... (hemo, peritoneal)

A B C D

D. CARDIOVASCULAR SYSTEM

(Items 1–4 are mutually exclusive)

1. No Symptoms .... Ⓐ

2. Symptoms with ordinary physical activity, none at rest .... Ⓑ

3. Symptoms with less than ordinary physical activity, none at rest .... Ⓒ

4. Symptoms at rest .... Ⓓ

5. History of myocardial infarction within last six months .... Ⓑ

6. History of hypertension (>200 systolic or >100 diastolic) .... Ⓑ

E. GASTROINTESTINAL SYSTEM – includes esophagus, gall bladder, liver, and pancreas.

(Items 1–4 are mutually exclusive)

1. No symptoms .... Ⓐ

2 Mild symptoms, controlled by adjustment of therapy .... Ⓑ

3 Mild or moderate symptoms, uncontrolled by therapy, but not restrictive to daily activity .... Ⓒ

4 Moderate or severe symptoms that are uncontrolled and restrictive to daily activity .... Ⓓ

F HEMATOLOGIC SYSTEM

1 No disorder .... Ⓐ

2. Chronic anemia and/or bleeding disorder .... Ⓑ

3. Periodic blood or component transfusions .... Ⓒ

4. Currently receiving cancer therapy (chemotherapy, radiation, immunosuppression) .... Ⓒ

5. Received previous cancer therapy:

a. Remission induced .... Ⓒ

b. No remission induced .... Ⓓ

c. Remission relapse(s) .... Ⓓ

G. METABOLIC SYSTEM

1 No disorder .... Ⓐ

2. Chronic metabolic disease .... Ⓑ

3. Chronic endocrinologic disease .... Ⓑ

4. Diabetes mellitus .... Ⓑ

5. Morbid obesity (>100% ideal weight) .... Ⓑ

6. Malnutrition .... Ⓑ

III. Determination of Patient's Preadmission Health Class. (A, B, C, or D)

A patient is in:

1. Class D – Severe restriction of activity due to disease; end stage disease. If he or she has one or more positive responses under column D.
2. Class C – Chronic disease producing serious but not incapacitating restriction of activity. If he or she has no positive responses under column D, but one or more positive responses under column C.
3. Class B – Mild to moderate limitation of activity because of a chronic medical problem. If he or she has no positive responses under column D nor C, but one or more positive responses under column B.
4. Class A – Prior good health; no functional limitations. If he or she has only positive responses under column A.

IV. INADEQUATE DATA BASE .... ○

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Table 5. Variables and Statistical Weights for Converting APS to Probability of Hospital Mortality

Variable	B
APS Score	0.1481
Years of Age > 40	0.0412
Sex	0.1391
0: Male	
1: Female	
Primary Organ System Failure (choose one):	
• Cardiovascular	-0.539
• Respiratory	-0.799
• Gasrointestinal	-0.805
• Hematological	-0.293
• Renal	-3.310
• Metabolic	-3.200
• Neurologic	0.000
Constant	-3.938

Table 6. Validation of APS

B. Validation Data Set (N = 396)	Hospital Discharge Status		
	Alive	Dead	Total
Predicted Condition			
Alive	234	51	285
Dead	33	78	111
TOTAL	267	129	396

Negative Predictive Value = 78/111 = 70%
Positive Predictive Value = 234/285 = 82%
Specificity = 234/267 = 88%
Sensitivity = 78/129 = 60%
Total Correct Classification = 312/396 = 79%

Decision Rule: 50% Predicted Risk of Death.

From Wagner et al., 1983

Table 7. Scoring Values for the Variables in SAPS

Variable SAPS Scale	4	3	2	1	0	1	2	3	4
Age (yr)					≤45	46–55	56–65	66–75	>75
Heart rate (beat/min)	≥180	140–179	110–139		70–109		55–69	40–54	<40
Systolic blood pressure (mm Hg)	≥190		150–189		80–149		55–79		<55
Body temperature (°C)	≥41	39.0–40.9		38.5–38.9	36.0–38.4	34.0–35.9	32.0–33.9	30.0–31.9	<30.0
Spontaneous respiratory rate (breath/min)	≥50	35–49		25–34	12–24	10–11	6–9		<6
or									
Ventilation or CPAP								Yes	
Urinary output (L/24 h)			>5.00	3.50–4.99	0.70–3.49		0.50–0.69	0.20–0.49	<0.20
Blood urea (mMol/L)	≥55.0	36.0–54.9	29.0–35.9	7.5–28.9	3.5–7.4	<3.5			
Hematocrit (%)	≥60.0		50.0–59.9	46.0–49.9	30.0–45.9		20.0–29.9		<20.0
White blood cell count (10^3/mm^3)	≥40.0		20.0–39.9	15.0–19.9	3.0–14.9		1.0–2.9		<1.0
Serum glucose (mMol/L)	≥44.5	27.8–44.4		14.0–27.7	3.9–13.9		2.8–3.8	1.6–2.7	<1.6
Serum potassium (mEq/L)	≥7.0	6.0–6.9		5.5–5.9	3.5–5.4	3.0–3.4	2.5–2.9		<2.5
Serum sodium (mEq/L)	≥180	161–179	156–160	151–155	130–150		120–129	110–119	<110
Serum HCO_3 (mEq/L)		>40.0		30.0–39.9	20.0–29.9	10.0–19.9		5.0–9.9	<5.0
Glasgow coma score					13–15	10–12	7–9	4–6	3

From Le Gall et al., 1984

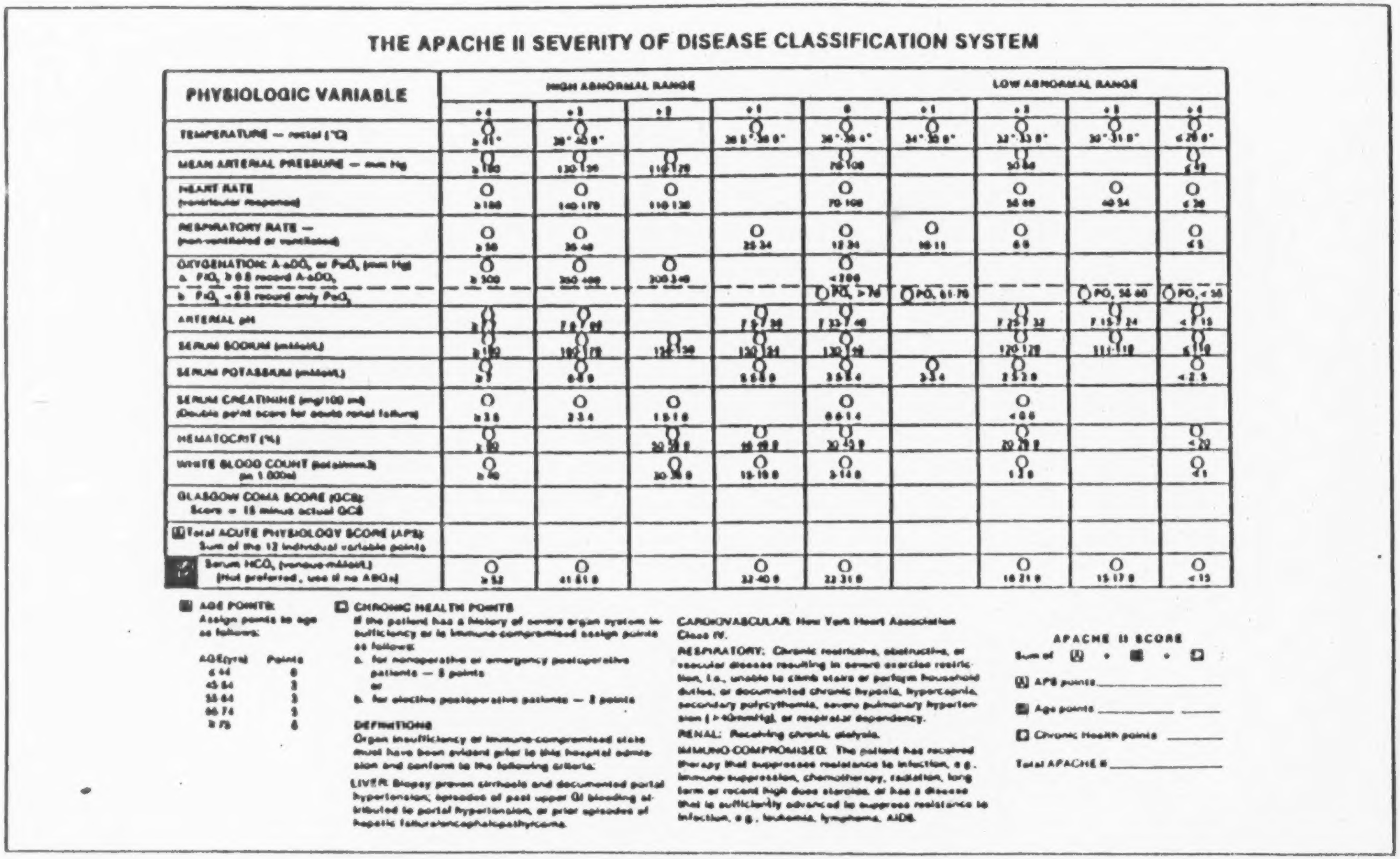
Table 8. Relationship between SAPS Score and ICU Mortality Rate

SAPS	No. of Patients	Mortality Rate (%)*
4	64	—
5–6	56	10.7 ± 4.1
7–8	75	13.3 ± 3.9
9–10	103	19.4 ± 7.8
11–12	106	24.5 ± 4.1
13–14	70	30.0 ± 5.5
15–16	81	32.1 ± 5.1
17–18	43	44.2 ± 7.6
19–20	28	50.0 ± 9.4
≥21	53	81.1 ± 5.4

* Mean ± SD.

From Le Gall et al., 1984

Table 9. Variables in APACHE II



THE APACHE II SEVERITY OF DISEASE CLASSIFICATION SYSTEM

PHYSIOLOGIC VARIABLE	HIGH ABNORMAL RANGE					LOW ABNORMAL RANGE			
	+4	+3	+2	+1	0	+1	+2	+3	+4
TEMPERATURE — rectal (°C)	○ ≥ 41°	○ 39°-40.9°		○ 38.5°-38.9°	○ 36°-38.4°	○ 34°-35.9°	○ 32°-33.9°	○ 30°-31.9°	○ ≤ 29.9°
MEAN ARTERIAL PRESSURE — mm Hg	○ ≥ 160	○ 130-159	○ 110-129		○ 70-109		○ 50-69		○ ≤ 49
HEART RATE (ventricular response)	○ ≥ 180	○ 140-179	○ 110-139		○ 70-109		○ 55-69	○ 40-54	○ ≤ 39
RESPIRATORY RATE — (non-ventilated or ventilated)	○ ≥ 50	○ 35-49		○ 25-34	○ 12-24	○ 10-11	○ 6-9		○ ≤ 5
OXYGENATION: A-aDO$_2$ or PaO$_2$ (mm Hg) a. FIO$_2$ ≥ 0.5 record A-aDO$_2$	○ ≥ 500	○ 350-499	○ 200-349		○ < 200				
b. FIO$_2$ < 0.5 record only PaO$_2$					○ PO$_2$ > 70	○ PO$_2$ 61-70		○ PO$_2$ 55-60	○ PO$_2$ < 55
ARTERIAL pH	○ ≥ 7.7	○ 7.6-7.69		○ 7.5-7.59	○ 7.33-7.49		○ 7.25-7.32	○ 7.15-7.24	○ < 7.15
SERUM SODIUM (mMol/L)	○ ≥ 180	○ 160-179	○ 155-159	○ 150-154	○ 130-149		○ 120-129	○ 111-119	○ ≤ 110
SERUM POTASSIUM (mMol/L)	○ ≥ 7	○ 6-6.9		○ 5.5-5.9	○ 3.5-5.4	○ 3-3.4	○ 2.5-2.9		○ < 2.5
SERUM CREATININE (mg/100 ml) (Double point score for acute renal failure)	○ ≥ 3.5	○ 2-3.4	○ 1.5-1.9		○ 0.6-1.4		○ < 0.6		
HEMATOCRIT (%)	○ ≥ 60		○ 50-59.9	○ 46-49.9	○ 30-45.9		○ 20-29.9		○ < 20
WHITE BLOOD COUNT (total/mm3) (in 1,000s)	○ ≥ 40		○ 20-39.9	○ 15-19.9	○ 3-14.9		○ 1-2.9		○ < 1
GLASGOW COMA SCORE (GCS): Score = 15 minus actual GCS									
🄰 Total ACUTE PHYSIOLOGY SCORE (APS): Sum of the 12 individual variable points									
Serum HCO$_3$ (venous-mMol/L) (Not preferred, use if no ABGs)	○ ≥ 52	○ 41-51.9		○ 32-40.9	○ 22-31.9		○ 18-21.9	○ 15-17.9	○ < 15

🄱 AGE POINTS:
Assign points to age as follows:

AGE(yrs)	Points
≤ 44	0
45-54	2
55-64	3
65-74	5
≥ 75	6

🄲 CHRONIC HEALTH POINTS
If the patient has a history of severe organ system insufficiency or is immuno-compromised assign points as follows:
a. for nonoperative or emergency postoperative patients — 5 points
or
b. for elective postoperative patients — 2 points

DEFINITIONS
Organ insufficiency or immuno-compromised state must have been evident prior to this hospital admission and conform to the following criteria:

LIVER: Biopsy proven cirrhosis and documented portal hypertension; episodes of past upper GI bleeding attributed to portal hypertension, or prior episodes of hepatic failure/encephalopathy/coma.

CARDIOVASCULAR: New York Heart Association Class IV.

RESPIRATORY: Chronic restrictive, obstructive, or vascular disease resulting in severe exercise restriction, i.e., unable to climb stairs or perform household duties, or documented chronic hypoxia, hypercapnia, secondary polycythemia, severe pulmonary hypertension (>40mmHg), or respirator dependency.

RENAL: Receiving chronic dialysis.

IMMUNO-COMPROMISED: The patient has received therapy that suppresses resistance to infection, e.g., immuno-suppression, chemotherapy, radiation, long term or recent high dose steroids, or has a disease that is sufficiently advanced to suppress resistance to infection, e.g., leukemia, lymphoma, AIDS.

APACHE II SCORE
Sum of 🄰 + 🄱 + 🄲
🄰 APS points ________
🄱 Age points ________ ________
🄲 Chronic Health points ________
Total APACHE II ________

From Meakins et al., 1984

Table 10. Variables and Statistical Weights for Converting APACHE II to Probability of Hospital Mortality

Variable	B	Variable	B
APACHE II Score	0.146		
Postemergency Surgery	0.603		
0: No			
1: Yes			
Principal Diagnostic Category Leading to ICU Admission (choose one):			
• Nonoperative Patients		• Postoperative Patients	
Respiratory failure or insufficiency from:		- Multiple Trauma	-1.684
- Asthma/Allergy	-2.108	- Admission Due to Chronic Cardiovascular Disease	-1.376
- COPD	-0.367		
- Pulmonary Edema (noncardiogenic)	-0.251	- Peripheral Vascular Surgery	-1.315
- Postrespiratory Arrest	-0.168	- Heart Valve Surgery	-1.261
- Aspiration/Poisoning/Toxic	-0.142	- Craniotomy for Neoplasm	-1.245
- Pulmonary Embolus	-0.128	- Renal Surgery for Neoplasm	-1.204
- Infection	0.000	- Renal Transplant	-1.042
- Neoplasm	0.891	- Head Trauma	-0.955
Cardiovascular failure or insufficiency from:		- Thoracic Surgery for Neoplasm	-0.802
- Hypertension	-1.798	- Craniotomy for ICH/SDH/SAH	-0.788
- Rhythm Disturbance	-1.368	- Laminectomy and Other Spinal Cord Surgery	-0.699
- Congestive Heart Failure	-0.424	- Hemorrhagic Shock	-0.682
- Hemorrhagic Shock/Hypovolemia	0.493	- GI Bleeding	-0.617
- Coronary Artery Disease	-0.191	- GI Surgery for Neoplasm	-0.248
- Sepsis	0.113	- Respiratory Insufficiency After Surgery	-0.140
- Postcardiac Arrest	0.393	- GI Perforation/Obstruction	0.060
- Cardiogenic Shock	-0.259		
- Dissecting Thoracic/Abdominal Aneurysm	0.731	For postoperative patients admitted to the ICU for sepsis or postarrest, use the corresponding weights for nonoperative patients.	
Trauma:			
- Multiple Trauma	-1.228		
- Head Trauma	-0.517		
Neurologic:		If not in one of the above, which major vital organ system led to ICU admission postsurgery?	
- Seizure Disorder	-0.584		
- ICH/SDH/SAH	0.723	- Neurologic	-1.150
Other:		- Cardiovascular	-0.797
- Drug Overdose	-3.353	- Respiratory	-0.610
- Diabetic Ketoacidosis	-0.507	- Gastrointestinal	-0.613
- GI Bleeding	0.334	- Metabolic/Renal	-0.196
If not in one of the specific groups above, then which major vital organ system was the principal reason for admission?			
- Metabolic/Renal	-0.885		
- Respiratory	-0.890	Constant	-3.517
- Neurologic	-0.759		
- Cardiovascular	0.470		
- Gastrointestinal	0.501		

Table 11. Variables in Original TISS

4 POINTS

a. Cardiac arrest and/or countershock within 48 hours
b. Controlled ventilation with or without PEEP
c. Controlled ventilation with intermittent or continuous muscle relaxants
d. Balloon tamponade of varices
e. Continuous arterial infusion
f. Pulmonary artery line
g. Atrial or ventricular pacing
h. Hemodialysis in unstable patient
i. Peritoneal dialysis
j. Induced hypothermia
k. Pressure-activated blood infusion
l. G-Suit
m. Measurement of cardiac output
n. Platelet transfusions
o. IABA (intra-aortic balloon assist)
p. Membrane oxygenation

3 POINTS

a. Hyperalimentation or renal failure fluid
b. Pacemaker on standby
c. Chest tubes
d. Assisted respiration
e. Spontaneous PEEP
f. Concentrated K drip (>60 mEq/L)
g. Nasotracheal or orotracheal intubation
h. Endotracheal suctioning (non-intubated patient)
i. Complex metabolic balance (frequent intake and output, Brookline scale)
j. Multiple ABG, bleeding, and STAT studies
k. Frequent infusions of blood products
l. Bolus IV medications
m. Multiple (>3) parenteral lines
n. Vasoactive drug infusion
o. Continued antiarrhythmia infusions
p. Cardioversion
q. Hypothermia blanket
r. Peripheral arterial line
s. Acute digitalization
t. Active diuresis for fluid overload or cerebral edema
u. Active Rx for metabolic alkalosis or acidosis

2 POINTS

a. CVP (Central Venous Pressure)
b. >2 IV lines
c. Hemodialysis for chronic renal failure
d. Fresh tracheostomy (less than 48 hours)
e. Spontaneous respiration via E-T tube or tracheostomy
f. Tracheostomy care

1 POINT

a. ECG monitoring
b. Hourly V.S. or neuro V.S.
c. "Keep open" IV route
d. Chronic anticoagulation
e. Standard intake and output
f. Frequent STAT chems
g. Intermittent IV medications
h. Multiple dressing changes
i. Complicated orthopedic traction
j. IV antimetabolite therapy
k. Decubitus treatment
l. Urinary catheter
m. Supplemental oxygen (nasal or mask)
n. IV antibiotics

From Cullen et al., 1974

Table 12. Variables in Updated TISS

4 Points

a. Cardiac arrest and/or countershock within past 48 h[a]
b. Controlled ventilation with or without PEEP[a]
c. Controlled ventilation with intermittent or continuous muscle relaxants[a]
d. Balloon tamponade of varices[a]
e. Continuous arterial infusion[a]
f. Pulmonary artery catheter
g. Atrial and/or ventricular pacing[a]
h. Hemodialysis in unstable patient[a]
i. Peritoneal dialysis
j. Induced hypothermia[a]
k. Pressure-activated blood infusion[a]
l. G-suit
m. Intracranial pressure monitoring
n. Platelet transfusion
o. IABA (intra-aortic balloon assist)
p. Emergency operative procedures (within past 24 h)[a]
q. Lavage of acute GI bleeding
r. Emergency endoscopy or bronchoscopy
s. Vasoactive drug infusion (> 1 drug)

3 Points

a. Central iv hyperalimentation (includes renal, cardiac, hepatic failure fluid)
b. Pacemaker on standby
c. Chest tubes
d. Intermittent mandatory ventilation (IMV) or assisted ventilation
e. Continuous positive airway pressure (CPAP)
f. Concentrated K+ infusion via central catheter
g. Nasotracheal or orotracheal intubation[a]
h. Blind intratracheal suctioning
i. Complex metabolic balance (frequent intake and output)[a]
j. Multiple ABG, bleeding, and/or STAT studies (> 4/shift)
k. Frequent infusions of blood products (> 5 units/24 h)
l. Bolus iv medication (nonscheduled)
m. Vasoactive drug infusion (1 drug)
n. Continuous antiarrhythmia infusions
o. Cardioversion for arrhythmia (not defibrillation)
p. Hypothermia blanket
q. Arterial line
r. Acute digitalization—within 48 h
s. Measurement of cardiac output by any method
t. Active diuresis for fluid overload or cerebral edema
u. Active Rx for metabolic alkalosis
v. Active Rx for metabolic acidosis
w. Emergency thora-, para-, and peri-cardiocenteses
x. Active anticoagulation (initial 48 h)[a]
y. Phlebotomy for volume overload
z. Coverage with more than 2 iv antibiotics
aa. Rx of seizures or metabolic encephalopathy (within 48 h of onset)
bb. Complicated orthopedic traction[a]

2 Points

a. CVP (central venous pressure)
b. 2 peripheral iv catheters
c. Hemodialysis—stable patient
d. Fresh tracheostomy (less than 48 h)
e. Spontaneous respiration via endotracheal tube or tracheostomy (T-piece or trach mask)
f. GI feedings
g. Replacement of excess fluid loss[a]
h. Parenteral chemotherapy
i. Hourly neuro vital signs
j. Multiple dressing changes
k. Pitressin infusion iv

1 Point

a. ECG monitoring
b. Hourly vital signs
c. 1 peripheral iv catheter
d. Chronic anticoagulation
e. Standard intake and output (q 24 h)
f. STAT blood tests
g. Intermittent scheduled iv medications
h. Routine dressing changes
i. Standard orthopedic traction
j. Tracheostomy care
k. Decubitus ulcer[a]
l. Urinary catheter
m. Supplemental oxygen (nasal or mask)
n. Antibiotics iv (2 or less)
o. Chest physiotherapy
p. Extensive irrigations, packings or debridement of wound, fistula or colostomy
q. GI decompression
r. Peripheral hyperalimentation/Intralipid therapy

---

[a] Therapeutic Intervention Scoring System explanation code:

4-Point Interventions: (a) Point score for 2 days after most recent cardiac arrest. (b) This does not mean intermittent mandatory ventilation which is a 3-point intervention. It does mean that regardless of the internal plumbing of the ventilator, the patient's full ventilatory needs are being supplied by the machine. Whether or not the patient is ineffectively breathing around the ventilator is irrelevant as long as the ventilator is providing all the patient's needed minute ventilation. (c) For example, D-tubocurarine chloride, pancuronium (Pavulon), metocurine (Metubine). (d) Use Sengstaken-Blakemore or Linton tube for esophageal or gastric bleeding. (e) Pitressin infusion via IMA, SMA, gastric artery catheters for control of gastrointestinal bleeding, or other intra-arterial infusion. This does not include standard 3 ml/h heparin flush to maintain catheter patency. (g) Active pacing even if a chronic pacemaker. (h) Include first 2 runs of an acute dialysis. Include chronic dialysis in patient whose medical situation now renders dialysis unstable. (j) Continuous or intermittent cooling to achieve body temperature less than 33°C. (k) Use of a blood pump or manual pumping of blood in the patient who requires rapid blood replacement. (p) May even be the initial emergency operative procedure—precludes diagnostic tests, i.e., angiography, CT scan.

3-Point Interventions: (d) The patient is supplying some of his own ventilatory needs. (g) Not a daily point score. Patient must have been intubated in the ICU (elective or emergency) within previous 24 h. (i) Measurement of intake/output above and beyond the normal 24-h routine. Frequent adjustment of intake according to total output. (x) Includes Rheomacrodex. (bb) For example, Stryker frame, CircOlectric.

2-Point Interventions: (g) Replacement of clear fluids over and above the ordered maintenance level.

1-Point Intervention: (k) Must have a decubitus ulcer. Does not include preventive therapy.

From Keene and Cullen, 1983

Table 13. Original MPM Admission Model

Variable	B	SE(B)	OR	95% C.I. Lower	95% C.I. Upper
Level of Consiousness	2.630	0.464	13.87	5.59	34.45
0: No coma/deep stupor					
1: Coma or deep stupor					
Type of Admission	1.630	0.41	5.10	2.29	11.40
0: Elective					
1: Emergency					
Cancer Part of Present Problem	1.490	0.444	4.44	1.86	10.59
0: No					
1: Yes					
Infection	0.677	0.251	1.97	1.20	3.22
0: No or Not Probable					
1: Probable					
Number of Organ System Failures	0.595	0.121			
(one-system odds ratio)			1.81	1.43	2.30
Age	0.038	0.0074			
(10-year odds ratio)			1.46	1.26	1.69
Systolic Blood Pressure (SBP)	-0.048	0.0189			
(SBP) squared	0.000131	0.000067			
Constant	-3.000				

Table 14. MPM Admission Model with CPR Prior to ICU Admission

				95% C.I.	
Variable	**B**	**SE(B)**	**OR**	**Lower**	**Upper**
Level of Consiousness	2.440	0.485	11.47	4.43	29.68
0: No coma/deep stupor					
1: Coma or deep stupor					
Type of Admission	1.810	0.403	6.11	2.77	13.46
0: Elective					
1: Emergency					
Cancer Part of Present Problem	1.490	0.431	4.44	1.91	10.33
0: No					
1: Yes					
Infection	0.965	0.239	2.62	1.64	4.19
0: No or Not Probable					
1: Probable					
CPR Prior to ICU Admission	0.974	0.464	2.65	1.07	6.58
0: No					
1: Yes					
Age	0.037	0.007			
(10-year odds ratio)			1.44	1.26	1.66
Systolic Blood Pressure (SBP)	-0.061	0.019			
(SBP) squared	0.000175	0.000067			
Constant	-1.370				

Table 15. Determining Probability of Hospital Mortality for Hypothetical Patient

Patient is 50 years of age; has cancer of the colon, a perforated bowel, and systolic blood pressure of 80 mm Hg; and is admitted for emergency surgery

Variable	**B**	**x(i)**	**B(i)x(i)**
Level of Consiousness	2.44	0	0
0: No coma/deep stupor			
1: Coma or deep stupor			
Type of Admission	1.81	1	1.81
0: Elective			
1: Emergency			
Cancer Part of Present Problem	1.49	1	1.49
0: No			
1: Yes			
Infection	0.965	1	0.965
0: No or Not Probable			
1: Probable			
CPR Prior to ICU Admission	0.974	0	0
0: No			
1: Yes			
Age	0.0368	50	1.84
(10-year odds ratio)			
Systolic Blood Pressure (SBP)	-0.0606	80	-4.848
(SBP) squared	0.000175	6400	1.12
Constant	-1.37		-1.37

Logit = 1.007

$P(Y=1|X) =$ 0.73

Table 16. Classification Tables for MPM Admission Models

Classification Table For MPM Original Admission Model
Validation Data Set

Cutpoint: .50

		OBSERVED		
		Live	**Die**	**Total**
PREDICTED	**Live**	1521	197	1718
	Die	80	199	279
	Total	1601	396	1997

Predictive Value for Dying = 199/279 = 71.33%
Predictive Value for Surviving = 1521/1718 = 88.53%
Sensitivity = 199/396 = 50.25%
Specificity = 1521/1601 = 95.00%
Total Correct Classification = 1720/1997 = 86.13%

Classification Table for Admission Model with CPR
Validation Data Set

Cutpoint: .50

		OBSERVED		
		Live	**Die**	**Total**
PREDICTED	**Live**	1525	228	1753
	Die	76	168	244
	Total	1601	396	1997

Predictive Value for Dying = 168/244 = 68.85%
Predictive Value for Surviving = 1525/1753 = 86.99%
Sensitivity = 168/396 = 42.42%
Specificity = 1525/1601 = 95.25%
Total Correct Classification = 1693/1997 = 84.78%

Table 17. Goodness of Fit Tests for MPM Admission Models

Goodness of Fit Test for Original Admission Model
Validation Data Set

	Survive		Die	
Pr(Dying)	**Observed**	**Expected**	**Observed**	**Expected**
.000-.016	199	197.64	1	2.36
.017-.028	197	195.44	3	4.56
.029-.045	196	192.66	4	7.34
.046-.068	187	187.44	12	11.56
.069-.102	184	182.96	16	17.04
.103-.155	176	174.64	24	25.36
.156-.233	169	161.21	30	37.79
.234-.370	142	141.36	58	58.64
.371-.630	108	103.52	92	96.48
.631-1.00	43	37.35	156	161.65
Total	1601	1574.22	396	422.78

Cg* = 6.53 df = 10 p = .77

Goodness of Fit Test for Admission Model with CPR
Validation Data Set

	Survive		Die	
Pr(Dying)	**Observed**	**Expected**	**Observed**	**Expected**
.000-.017	199	197.44	1	2.56
.018-.029	197	196.34	4	4.66
.030-.049	193	191.04	6	7.96
.050-.073	189	185.74	9	12.26
.074-.104	178	183.33	23	17.67
.105-.154	177	174.78	23	25.22
.155-.236	160	160.99	39	38.01
.237-.344	139	142.5	61	57.5
.345-.564	118	112.26	82	87.74
.565-1.00	51	44.42	148	154.58
Total	1601	1588.84	396	408.16

Cg* = 6.73 df = 10 p = .75

Table 18. MPM Admission Model Based on Estimation and Validation Data Sets

				95% C.I.	
Variable	B	SE(B)	OR	Lower	Upper
Level of Consiousness	2.890	0.2592	18.00	10.83	29.91
0: No coma/deep stupor					
1: Coma or deep stupor					
Type of Admission	1.267	0.2196	3.55	2.31	5.46
0: Elective					
1: Emergency					
CPR Prior to ICU Admission	1.014	0.2656	2.76	1.64	4.64
0: No					
1: Yes					
Cancer Part of Present Problem	0.941	0.1866	2.56	1.78	3.70
0: No					
1: Yes					
History of Chronic Renal Failure	0.640	0.2174	1.90	1.24	2.91
0: No					
1: Yes					
Infection	0.556	0.1304	1.74	1.35	2.25
0: No or Not Probable					
1: Probable					
Age	0.048	0.0041			
(10-year odds ratio)			1.61	1.49	1.75
Previous ICU Admission within 6 Months	0.439	0.1514	1.55	1.15	2.09
0: No or Not Probable					
1: Probable					
Heart Rate at ICU Admission	0.007	0.0025			
(10-beat/min odds ratio)			1.08	1.03	1.13
Surgical Service at ICU Admission	-0.380	0.1419	0.68	0.52	0.90
0: No					
1: Yes					
Systolic Blood Pressure (SBP)	-0.046	0.0087			
(SBP) squared	0.000116	0.00003			
Constant	-2.968				

Table 19. Classification Table and Goodness of Fit Test for MPM Combined Admission Model

Classification Table For MPM Combined Admission Model
Estimation Data Set

Cutpoint: .50

		OBSERVED		
		Live	**Die**	**Total**
PREDICTED	**Live**	2058	284	2342
	Die	72	230	302
	Total	2130	514	2644

Predictive Value for Dying = 230/302 = 76.16%
Predictive Value for Surviving = 2058/2342 = 87.87%
Sensitivity = 230/514 = 44.75%
Specificity = 2058/2130 = 96.62%
Total Correct Classification = 2288/2644 = 86.54%

Goodness of Fit Test for MPM Combined Admission Model
Estimation Data Set

	Survive		**Die**	
Pr(Dying)	**Observed**	**Expected**	**Observed**	**Expected**
0.000-.0164	263	262.03	2	2.97
.0165-.0256	264	259.44	1	5.57
.0257-.0381	256	255.76	8	8.24
.0382-.0586	247	251.35	17	12.65
.0587-.0888	243	245.63	22	19.37
.0889-.1369	234	234.34	30	29.65
.1370-.2147	223	219.21	42	45.79
.2148-.3217	196	193.38	68	70.62
.3218-.5454	146	151.35	118	112.65
.5455-1.000	58	57.47	206	206.53
Total	2130	2129.96	514	514.04

Cg* = 7.08 df = 8 p = .53

Table 20. MPM 24 Hour Model

				95% C.I.	
Variable	**B**	**SE(B)**	**OR**	**Lower**	**Upper**
Coma/Deep Stupor at 24 Hours	3.499	0.3792	33.07	15.73	69.54
0: No					
1: Yes					
Cancer Part of Present Problem	0.995	0.2323	2.70	1.72	4.26
0: No					
1: Yes					
Emergency Admission	0.802	0.2608	2.23	1.34	3.72
0: No					
1: Yes					
PT > 3 Seconds Above Lab Standard	0.738	0.1999	2.09	1.41	3.09
0: No					
1: Yes					
Probable Shock	0.674	0.1954	1.96	1.34	2.88
0: No					
1: Yes					
Urine Output < 150 ml in 8 hours	0.651	0.1803	1.92	1.35	2.73
0: No					
1: Yes					
Confirmed Infection	0.538	0.1640	1.71	1.24	2.36
0: No					
1: Yes					
PO2 < 60	0.497	0.1847	1.64	1.14	2.36
0: No					
1: Yes					
FiO2 > 50%	0.475	0.2139	1.61	1.06	2.44
0: No					
1: Yes					
Creatinine > 2.0	0.457	0.1918	1.58	1.08	2.30
0: No					
1: Yes					
Age	0.044	0.0051			
(10-year odds ratio)			1.55	1.41	1.72
Hours of Mechanical Ventilation	0.026	0.0092			
(8-hour odds ratio)			1.23	1.07	1.43
Number of Lines at 24 Hours	0.154	0.0528			
(1-line odds ratio)			1.17	1.05	1.29
Surgical Service at 24 Hours	-0.708	0.1834	0.49	0.34	0.71
0: No					
1: Yes					
Constant	-6.592				

Table 21. Classification Table and Goodness of Fit Test for MPM 24 Hour Model

Classification Table For MPM 24 Hour Model
Estimation Data Set

Cutpoint: .50

		OBSERVED		
		Live	**Die**	**Total**
PREDICTED	**Live**	1185	179	1364
	Die	73	229	302
	Total	1258	408	1666

Predictive Value for Dying = 229/302 = 75.83%
Predictive Value for Surviving = 1185/1364 =86.88%
Sensitivity = 229/408 = 56.13%
Specificity = 1185/1258 = 94.20%
Total Correct Classification = 1414/1666 =84.87%

Goodness of Fit Test for MPM 24 Hour Model
Estimation Data Set

	Survive		Die	
Pr(Dying)	**Observed**	**Expected**	**Observed**	**Expected**
.0000-.0162	167	165.31	0	1.69
0163-.0327	164	163.09	3	3.91
.0328-.0507	159	159.06	7	6.94
.0508-.0800	157	156.18	10	10.82
.0801-.1187	150	149.70	16	16.3
.1188-.1801	142	142.82	25	24.18
.1802-.2850	121	128.59	46	38.41
.2851-.4531	109	106.29	57	59.71
.4532-.7318	68	68.02	99	98.98
.7319-1.000	21	18.94	145	147.06
Total	1258	1258	408	408

$Cg^* = 4.42$ $df = 8$ $p = .82$

Table 22. MPM 48 Hour Model

				95% C.I.	
Variable	B	SE(B)	OR	Lower	Upper
Coma/Deep Stupor at 48 Hours	2.864	0.4789	17.54	6.86	44.84
0: No					
1: Yes					
Urine Output < 150 ml in 8 hours (24-48 hr)	0.990	0.2265	2.69	1.73	4.20
0: No					
1: Yes					
Coma/Deep Stupor at ICU Admission	0.977	0.3335	2.66	1.38	5.11
0: No					
1: Yes					
Emergency Admission	0.960	0.2763	2.61	1.52	4.49
0: No					
1: Yes					
PT > 3 Seconds Above Lab Standard (24-48 hr)	0.909	0.2700	2.48	1.46	4.21
0: No					
1: Yes					
FiO2 > 50% (in the period 24-48 hours)	0.842	0.2573	2.32	1.40	3.84
0: No					
1: Yes					
Cancer Part of Present Problem	0.816	0.2551	2.26	1.37	3.73
0: No					
1: Yes					
Confirmed Infection	0.471	0.1769	1.60	1.13	2.27
0: No					
1. Yes					
Age	0.042	0.0057			
(10-year odds ratio)			1.53	1.37	1.71
Total Hours of Mechanical Ventilation in ICU	0.021	0.0045			
(8-hour odds ratio)			1.19	1.11	1.27
Total Hours of Continuous IV Vasoactive Drug Tx	0.017	0.0065			
(8-hour odds ratio)			1.15	1.04	1.27
Constant	-5.860				

Table 23. Classification Table and Goodness of Fit Test for MPM 48 Hour Model

Classification Table For MPM 48 Hour Model
Estimation Data Set

Cutpoint: .50

		OBSERVED		
		Live	**Die**	**Total**
PREDICTED	**Live**	604	156	760
	Die	65	169	234
	Total	669	325	994

Predictive Value for Dying = 169/234 = 72.22%
Predictive Value for Surviving = 604/760 = 79.47%
Sensitivity = 169/325 = 52.00%
Specificity = 604/669 = 90.28%
Total Correct Classification = 773/994 = 77.77%

Goodness of Fit Test for MPM 48 Hour Model
Estimation Data Set

	Survive		Die	
Pr(Dying)	**Observed**	**Expected**	**Observed**	**Expected**
.0000-.0503	99	96.18	0	2.82
.0504-.0864	92	92.28	7	6.72
.0865-.1183	92	89.6	8	10.4
.1184-.1762	89	85.37	11	14.63
.1763-.2386	74	78.78	25	20.22
.2387-.3157	69	72.37	31	27.63
.3158-.4204	62	62.83	37	36.17
.4205-.5526	46	51.28	53	47.72
.5527-.7960	37	32.46	63	67.54
.7961-1.000	9	7.84	90	91.16
Total	669	668.99	325	325.01

Cg* = 8.86 df = 8 p = .35

Table 24. Summary of Major Classification Systems

	A	B	C
APACHE-type Methods	Data Requirements **Number of Variables**	Data Requirements **Time of Data Collection**	Data Requirements **Availability of Variables**
APS	33 variables	Up to 32 hours after ICU admission	Generally available from record review. Assumed normal if not recorded.
APACHE	33 APS variables plus chronic health status. Age, sex, and primary organ system involved are needed for probability.	Same as above	Same as above
APACHE II	12 variables plus age and chronic health status. These plus other variables are needed to transform to probability.	Up to 24 hours after ICU admission	Generally available and all must be obtained.
SAPS	13 clinical variables (similar to APS) plus age.	Same as above	Generally available from record review. Assumed normal if not recorded.
TISS Methods			
Original TISS	57 interventions	Every 24 hours	Record whatever interventions are mentioned in chart.
Updated TISS	76 interventions	Same as above	Same as above
MPM System			
Admission (OSF)	7 variables, one of which is a review of 8 major organ systems.	At ICU admission	Readily available
Admission (CPR)	7 variables	At ICU admission	Same as above
24 hours	14 variables. One of these, shock, is a composite of 4 other variables reflecting hemodynamic status.	Up to 24 hours in ICU	Generally available from record review. Assumed normal if not recorded.
48 hours	11 variables	Up to 48 hours in ICU	Same as above

Table 24. Summary of Major Classification Systems

	D	E	F
APACHE-type Methods	Data Requirements **Age as a Variable**	Data Requirements **Chronic Disease as a Variable**	Data Requirements **Data ICU Treatment Dependent**
APS	Not for calculating score. However, it is required for conversion to probability.	No	Some variables depend on ICU treatment.
APACHE	Same as above	Yes. Letter code assigned as a separate component.	Same as above
APACHE II	Yes - points range from 0-6	Yes. Either 0, 2 or 5 points are assigned and added to total score.	Same as above
SAPS	Yes - points range from 0-4	No	Same as above
TISS Methods			
Original TISS	No	No	Virtually all variables reflect ICU treatment.
Updated TISS	No	No	Same as above
MPM System			
Admission (OSF)	Yes - entered as continuous variable	Cancer part of present problem is one of the 7 variables.	No variables reflect ICU treatment.
Admission (CPR)	Same as above	Same as above	Same as above
24 hours	Same as above	Cancer part of present problem is one of the 14 variables.	Some variables reflect ICU treatment.
48 hours	Same as above	Cancer part of present problem is	Same as above

Table 24. Summary of Major Classification Systems

	G	H	I
APACHE-type Methods	Data Requirements **Complexity of Data Collection**	Data Requirements **Skill Level of Data Collector**	Model Development **Selection of Variables**
APS	Time consuming but variables should be readily available from records.	Minimal level of skill required - record reading and thorough knowledge of medical terms	Panel of experts defined variables and weights.
APACHE	Time consuming and more complex, since it requires assessment of chronic health status.	Same as above	Same as above
APACHE II	Less time consuming but complex because chronic health points includes estimate of immune status.	Same as above. Chronic health component may require more skilled judgement.	Same as above
SAPS	Faster than any of the above. Variables should be readily available from records.	Minimal level of skill required - record reading and thorough knowledge of medical terms	Same as above
TISS Methods			
Original TISS	Relatively simple but may be time consuming depending on quality of medical record.	Moderate level of skill required - Thorough knowledge of ICU treatments and ICU records	Same as above
Updated TISS	Same as above	Same as above	Same as above
MPM System			
Admission (OSF)	Relatively simple except for number of organ systems in failure.	Minimal level of skill required except for organ system failures which requires skilled judgement.	Multiple Logistic Regression identified significant variables 755 pts in 1 hospital
Admission (CPR)	Variables should be easy to collect quickly.	Minimal level of skill required	Same as above
24 hours	More complex than above since shock variables must be evaluated.	Moderate level of skill required - record reading and thorough knowledge of medical terms	Same as above with 1666 patients in 1 institution
48 hours	Less complex than above.	Same as above	Same as above with 994 patients in 1 institution

Table 24. Summary of Major Classification Systems

	J	K	L
APACHE-type Methods	Model Development **Assignment of Weights to Variables** Scale or range of weights	Model Evaluation **Validation Data Set**	Model Evaluation **Total Correct Classification Rate**
APS	Score between 0-4 assigned each variable. MLR was used to determine weights for transforming scores to probabilities.	Several US and foreign hospitals.	79.0% 86.4% 79.0%
APACHE	Same as above	Same as above	N.A.
APACHE II	Most variables assigned 0 to 4 points, except: coma, 0 to 12 points; age, 0 to 6 points; and chronic health status, 0 to 5 pts.	5030 patients in 13 US hospitals. Not clear how MLR weights were derived.	85.5%
SAPS	Score between 0-4 assigned each variable.	Has been tested in several French hospitals.	84.9%
TISS Methods			
Original TISS	Each intervention is assigned 1 to 4 points regardless of duration of therapy.	Not applicable since TISS does not yield a probability of hospital mortality.	N.A.
Updated TISS	Each intervention is assigned 1 to 4 points.	Same as above	N.A.
MPM System			
Admission (OSF)	Weights are on a continuum as determined by maximum likelihood techniques.	1997 consecutive ICU patients in one hospital.	86.1%
Admission (CPR)	Same as above	Currently being tested in several US and foreign hospitals.	84.8%
24 hours	Same as above	Not yet validated. Classification rates are based on estimation data set.	84.9%
48 hours	Same as above	Same as above	77.8%

Table 24. Summary of Major Classification Systems

	M	N	O	P
	Model Evaluation **Sensitivity**	Model Evaluation **Specificity**	Model Evaluation **Predictive Value of Surviving**	Model Evaluation **Predictive Value of Dying**
APACHE-type Methods				
APS	60.0% 57.1% 40.0%	88.0% 93.7% 94.0%	82.0% 89.8% 80.0%	70.0% 69.1% 72.0%
APACHE	N.A.	N.A.	N.A.	N.A.
APACHE II	47.0%	94.9%	87.9%	69.6%
SAPS	42.0%	96.2%	86.5%	71.8%
TISS Methods				
Original TISS	N.A.	N.A.	N.A.	N.A.
Updated TISS	N.A.	N.A.	N.A.	N.A.
MPM System				
Admission (OSF)	50.2%	95.0%	88.5%	71.3%
Admission (CPR)	42.4%	95.2%	87.0%	68.8%
24 hours	56.1%	94.2%	86.9%	75.8%
48 hours	52.0%	90.3%	79.5%	72.2%

Table 24. Summary of Major Classification Systems

	Q	R	S
APACHE-type Methods	Cost **Automation Requirements**	Cost **Staff Requirements for Data Collection**	Uses-Clinical Decisionmaking **At admission** (Discussions with pts/family)
APS	None required to calculate APS points. Calculating probability requires programmable device.	Special effort or personnel would be required to collect the required number of variables.	No. Requires 32 hours of data gathering.
APACHE	Same as above	Same as above	Same as above
APACHE II	None for calculating APACHE II points. Calculating probability requires programmable device.	Same as above	No. Requires 24 hours of data gathering.
SAPS	None required to calculate SAPS points.	Same as above	Same as above
TISS Methods			
Original TISS	None required to calculate TISS points.	Same as above	No. All variables depend on treatment.
Updated TISS	Same as above	Same as above	Same as above
MPM System			
Admission (CSF)	Programmable device is needed to calculate probability.	Less of a data collection burden than above methods.	Possible. All variables are available at admission.
Admission (CPR)	Same as above	Least data collection burden of all methods considered.	Same as above
24 hours	Same as above	Special effort or personnel would be required to collect the required number of variables.	No.
48 hours	Same as above	Same as above	No.

Table 24. Summary of Major Classification Systems

	T	U	V
APACHE-type Methods	Uses-Clinical Decisionmaking **Discharge** (Appropriateness for discharge)	Uses-Clinical Decisionmaking **Triage**	Uses-Clinical Decisionmaking **Monitoring Patient Progress**
APS	Patients with low scores may be monitor patients and require a short stay.	Difficult to compare outcomes of patients with different lengths of stay and treatment requirements. Use of this model for long term patients is unclear.	Scores calculated after 32 hours in the ICU have not been studied as predictors of outcome.
APACHE	Same as above	Same as above	Same as above
APACHE II	Same as above	Same as above	Same as above but after 24 hours.
SAPS	Same as above	Same as above	Same as above
TISS Methods			
Original TISS	Low TISS scores may reflect low nursing requirements and readiness for discharge.	Provides cumulative information on amount of therapy. Patients with less therapy might be appropriately transferred to alternative Tx site.	Monitors amount of treatment provided in each 24 hour period.
Updated TISS	Same as above	Same as above	Same as above
MPM System			
Admission (OSF)	Patients with low probabilities may be monitor patients and require a short stay.	Augmented by clinical judgement, could be used for admission decisions.	No
Admission (CPR)	Same as above	Same as above	No
24 hours	Changing probabilities over time may influence discharge decisions.	Difficult to compare outcomes of patients with different lengths of stay and treatment requirements. Use of this model for long term patients is unclear.	Changing probabilities over time may add substantial information for selected patients.
48 hours	Same as above	Same as above	Same as above

Table 24. Summary of Major Classification Systems

	W	X	Y
APACHE-type Methods	Uses-Clinical Decisionmaking **Outcome Consensus for Treatment Team and for Family Conferences**	Uses-Quality Assessment **ICU A vs ICU B**	Uses-Quality Assessment **Treatment A vs Treatment B**
APS	It is easier to interpret results when score has been transformed to a probability. Physician acceptance of this scoring system has not been reported.	Difficult since some data are dependent on ICU treatment.	Difficult since some data are dependent on ICU treatment
APACHE	Same as above	Same as above	Same as above
APACHE II	Same as above	Same as above	Same as above
SAPS	Same as above using empirical mortality rates	Same as above	Same as above
TISS Methods			
Original TISS	Amount of treatment received may support clinical decisions	No	No
Updated TISS	Same as above	No	No
MPM System			
Admission (OSF)	Direct estimate of the probability of hospital mortality is available. Physician acceptance of this statistical model has not been reported.	It is possible to compare one hospital's performance to a referent hospital's.	Yes since variables are collected at admission to ICU.
Admission (CPR)	Same as above	Same as above	Same as above
24 hours	Same as above	Difficult since some data are dependent on ICU treatment.	Difficult since some data are dependent on ICU treatment.
48 hours	Same as above	Same as above	Same as above

Table 24. Summary of Major Classification Systems

	Z	AA	AB
APACHE-type Methods	Uses-Quality Assessment **Physician Admission Practice**	Uses-Quality Assessment **Physician Care**	Uses-Resource Allocation **Nursing Assignment**
APS	Difficult since data are dependent on ICU treatment.	Difficult since data are dependent on ICU treatment	No
APACHE	Same as above	Same as above	No
APACHE II	Same as above	Same as above	No
SAPS	Same as above	Same as above	No
TISS Methods			
Original TISS	No	Controlling for patient condition, it is possible to compare physicians treatment patterns.	Yes
Updated TISS	No	Same as above	Yes
MPM System			
Admission (OSF)	Yes since variables are collected at admission to ICU.	Yes since variables are collected at admission to ICU.	No
Admission (CPR)	Same as above	Same as above	No
24 hours	Difficult since data are dependent on ICU treatment.	Difficult since data are dependent on ICU treatment.	No
48 hours	Same as above	Difficult since data are dependent on ICU treatment.	No

Table 24. Summary of Major Classification Systems

	AC	AD
APACHE-type Methods	Uses-Resource Allocation **Number of ICU Beds**	Financial Implications **Institutional Reimbursement and Cost Containment**
APS	Used as measure of case mix, this information could helpful in documenting institutional or geographic variations.	These methods were designed to measure severity of illness and may not accurately reflect resource use for individual patients. Their use to enhance institutional reimbursement would depend upon an assumed relationship between severity of illness and appropriate resouce use.
APACHE	Same as above	
APACHE II	Same as above	
SAPS	Same as above	
TISS Methods		
Original TISS	Amount of therapy provided may add resource measure to case mix studies.	This method was designed to give a cumulative measure of treatments rendered. It does not provide a direct measure of severity of illness. As a result, it does not assess the appropriateness of care.
Updated TISS	Same as above	
MPM System		
Admission (OSF)	Used as measure of case mix, this information could helpful in documenting institutional or geographic variations.	Same as APACHE group
Admission (CPR)	Same as above	Same as APACHE group
24 hours	Same as above	Changing probabilities over time may be more effective in identifying cost outliers than other methods.
48 hours	Same as above	Same as above

Table 25. Comparison of Models

	Pts who Lived (n=1601)		Pts who Died (n=396)	
	Mean	Std Dev	Mean	Std Dev
MPMadm(OSF)	.159	0.16	.490	0.27
MPMadm(CPR)	.140	0.16	.471	0.29
APS Probability	.155	0.18	.558	0.29
SAPS Probability	.125	0.13	.423	0.23

Friedman's ANOVA

	Pts who Lived	Pts who Died
	Mean Ranks	Mean Ranks
MPMadm(OSF)	2.11	2.01
APS Probability	2.02	2.34
SAPS Probability	1.87	1.66
Chi-square (2 df) =	48.24	91.4
p-value	< 0.0001	< 0.0001

	Pts who Lived	Pts who Died
	Mean Ranks	Mean Ranks
MPMadm(CPR)	1.98	1.96
APS Probability	2.08	2.35
SAPS Probability	1.94	1.69
Chi-square (2 df) =	16.43	86.32
p-value	< 0.0003	< 0.0001

Table 26. Goodness of Fit Tests MPM, APS and SAPS - Validation Data Set (n=1,997)

	MPMadm(OSF)				APS				SAPS			
	Survive		Die		Survive		Die		Survive		Die	
Pr(Dying)	Oi	Ei	Oi	Ei	Oi	Ei	Oi	Ei	Oi	Ei	Oi	Ei
.000-.099	954	947.2	35	41.8	868	846.6	19	40.4	976	944.6	24	55.4
.100-.199	299	293.0	44	50.0	347	329.3	37	54.7	365	375.9	70	59.1
.200-.299	143	141.2	45	46.8	137	138.8	47	45.2	109	110.3	38	36.8
.300-.399	76	72.8	36	39.2	96	79.0	25	42.0	73	85.8	61	48.2
.400-.499	49	47.5	37	38.5	52	51.8	42	42.2	17	35.1	48	29.9
.500-.599	32	30.5	36	37.5	37	34.7	39	41.3	51	60.5	82	72.5
.600-.699	18	16.6	30	31.4	25	21.9	37	40.1				
.700-.799	19	16.3	45	47.7	15	14.2	42	42.8	9	17.3	66	57.7
.800-.899	6	.8	41	40.2	9	8.0	45	46.0				
.900-.999	5	2.3	47	49.7	15	3.8	63	74.2	1	0.6	7	7.4
Total	1601	1574	396	422.8	1601	1528	396	468.8	1601	1630	396	367

	MPMadm(OSF)	APS	SAPS
Hg*	6.88	64.67	55.08
df	10	10	8
p-value	0.74	<.001	<.001

- Oi: Observed number of patients
- Ei: Expected number of patients based upon probability of hospital mortality

Table 27. Comparison of MPM, APS and SAPS Classification Rates

	MPM Admission (OSF)	MPM Admission (CPR)	APS	SAPS
Sensitivity	50.2%	42.4%	57.1%	42.0%
Specificity	95.0%	95.2%	93.7%	96.2%
Predictive Value for Dying	71.3%	68.3%	69.1%	71.8%
Predictive Value for Surviving	88.5%	87.0%	89.8%	86.5%
Total Correct Classification	86.1%	84.8%	86.4%	84.9%

- All classifications based on 1997 patients in validation data set
- MPM Admission (OSF): MPM admission model containing number of organ systems in failure
- MPM Admission (CPR): MPM admission model containing CPR prior to ICU admission
- APS: Based on published multiple logistic regression model - Knaus et al., The Lancet, September 18, 1982
- SAPS: Based on death rates associated with SAPS scores for 3,655 patients - as observed by Le Gall and associates

Table 28. Comparison of Discrepancies in Classification Between APS to MPM

MPMadm(OSF) vs APS

Patients who: Lived to hospital discharge (n=1,601)

		APS		
		Predict Live	Predict Die	Total
MPMadm(OSF)	Predict Live	1443	70	1513
	Predict Die	57	31	88
		1500	101	1601

McNemar's Chi Square = 1.13
p-value = 0.290

Patients who: Died in the hospital (n=396)

		APS		
		Predict Live	Predict Die	Total
MPMadm(OSF)	Predict Live	117	102	219
	Predict Die	53	124	177
		170	226	396

McNemar's Chi Square = 14.86
p-value < 0.001

MPMadm(CPR) vs APS

Patients who: Lived to hospital discharge (n=1,601)

		APS		
		Predict Live	Predict Die	Total
MPMadm(CPR)	Predict Live	1449	76	1525
	Predict Die	51	25	76
		1500	101	1601

McNemar's Chi Square = 4.54
p-value = 0.033

Patients who: Died in the hospital (n=396)

		APS		
		Predict Live	Predict Die	Total
MPMadm(CPR)	Predict Live	119	109	228
	Predict Die	51	117	168
		170	226	396

McNemar's Chi Square = 20.31
p-value < 0.001

Table 29. Summary of Other Approaches to Patient Classification

	Purpose (Reimbursement, severity, prediction, resource use)	How was it derived? (Panel of experts or statistical modelling)	Variable characteristics (No. of variables, routine, when collected)
Systems for Specific Critical Illnesses			
Burn Index (Feller)	Predict mortality of burn victims.	Empirical data from National Burn Information Exchange.	Age, area and depth of burn, and inhalation components, measured at time of admission.
Complication Impact Index (Civetta)	Predict mortality	Based on multivariate model.	8 system complications plus age collected over first 48 hours.
Computer Derived CCU Protocol (Goldman)	Define criteria for admission to CCU of patients with chest pain.	Statistical model using recursive partitioning.	9 variables including 2 related to EKG. Performed in emergency room.
Coronary Intensive Care Function (Pozen)	Define criteria for admission to CCU of patients with chest pain.	Multiple logistic regression model.	9 clinical and EKG variables collected in the emergency room.
Coronary Prognostic Index (Norris)	Prediction of MI outcome.	Objective weights based on discriminant function analysis.	6 variables including age and extent of MI.
Injury Severity Score (Champion)	Predict outcome in multiple trauma.	Panel of experts. Used the square of the Abbreviated Injury Scale (AIS).	Grading of 1 to 5 for each of 6 anatomic areas of the body.
Glasgow Coma Score (Jennett)	Predicting outcome for patients with head injury.	Panel of experts	3 variables and best verbal and motor responses collected on admission and at variable intervals.
Global Index (Champion)	Developing audit screens to identify trauma outliers.	Panel of experts	Measured once daily in ICU. 8 variables screening renal, hepatic, respiratory and CNS function.
Multi Factorial Index of Cardiac Risk (Goldman)	Predict cardiac complications for major non-cardiac surgery	Multivariate discriminant analysis.	9 clinical factors collected pre-op.
Revised Estimated Survival Probability (Levy)	Severity of illness and prediction of mortality.	Used data from national survey of patients admitted with ICDA-8 trauma codes. Index is product of single-condition survival rates	Number of variables depends upon number of trauma codes recorded.
Streamlining ICU Care (Thibault and Mulley)	Define criteria for admission and continued stay.	Panel of experts	Variables are related to chest pain, pulmonary edema and syncope. Variables are observed at admission and periodically.
Trauma Score (Champion)	Predict outcome of trauma	Panel of experts interpreted empirical	7 simple physiological terms collected by emergency personnel in the field.

Table 29. Summary of Other Approaches to Patient Classification

	Purpose (Reimbursement, severity, prediction, resource use)	**How was it derived?** (Panel of experts or statistical modelling)	**Variable characteristics** (No. of variables, routine, when collected)
Systems for Specific Critical Illnesses (Continued)			
Trauma Severity Index (Gustafson) (Based on Wisconsin Trauma Index)	EMS evaluation using case mix	Panel of experts	19 variables, each at 3 or 4 levels involving 5 body systems, age, and burn. Collected in the field.
Classifications Based on Invasive Measurements			
Accumulative Prognostic Index for Drug Overdose (Afifi)	Predict survival after drug overdose.	Objective weights based on discriminant function analysis and multiple logistic regression to obtain probabilities.	5 clinical hemodynamic variables measured over time.
Global Predictive Index in Circulatory Failure (Bland and Shoemaker)	Predict mortality of surgical ICU patients.	Unusual statistical methodology used to develop severity indices for 5 clusters of variables.	35 hemodynamic or physiological variables collected pre-, intra-, and post-operatively.
Myocardial Infarction and Shock (Afifi)	Predict mortality	Same as above	Arterial lactate and stroke index or central venous pressure measured during course of coronary care.
General Systems			
Diagnostic Related Groups (Fetter)	Case mix for utilization review. Later for prospective reimbursement.	Panel of experts classified diseases and procedures. Weights applied by reference to Medicare charges and geographic locale.	467 diagnostic categories coded at hospital discharge.
Generalized Patient Management Paths (Young)	Case mix for cost analysis and reimbursement.	50 disease-specific panels of physicians identified 800 pt management categories (PMCs). Hospital Cost data analyzed.	Discharge diagnoses used to identify up to five PMCs, comorbid, not heirarchical. Adm & disch data used to specify pt mgt path.
Generic Algorithms (Bertram)	Case mix for reimbursement and possibly quality assessment.	Panel of experts. Grouping by empirical data.	Primary diagnosis plus secondary diagnoses surgical procedure and/or length of stay.
MEDICUS (Hegyvary)	Nursing assignment and cost management.	Panel of experts	37 yes/no statements for each patient at the beginning of each nursing shift. Patient is placed into one of 5 nursing care groups.
MEDISGRIPS (Brewster)	Case mix for reimbursement	Panel of experts	Patient classified into 1 of 4 severity levels ranging from minimal symptoms to organ failure. Determined early in hospitalization.
Severity of Illness Index (Horn)	Reimbursement and resource use.	Panel of experts	7 categories including stage of principal diagnosis, complications, use of resources and response to therapy. 1-4 scale for each.
Staging of Disease (Gonnella)	Severity of specific well-defined diseases.	Panel of experts	420 specific diagnoses staged from . to 4, similar to cancer staging (local, regional and systemic).

Table 29. Summary of Other Approaches to Patient Classification

	Special reference to the elderly?	Use for clinical decisionmaking for the critically ill?	Other general comments
Systems for Specific Critical Illnesses			
Burn Index (Feller)	Yes. Age is an integral factor.	Yes. Can assist in the discussion of prognosis with patient and family.	Widely used. There have been refinements since the original 1979 model.
Complication Impact Index (Civetta)	Yes. Separate weight for age.	Algorithm required for producing probability of mortality is not presented.	Not widely applied.
Computer Derived CCU Protocol (Goldman)	Yes. Age >70	Yes. Could reduce the number of low risk CCU admissions.	Validated prospectively in 2 sets of patients in teaching hospitals. Physician acceptance not yet determined.
Coronary Intensive Care Function (Pozen)	No	Yes. Could reduce the number of low risk CCU admissions.	Multi-hospital validation complete. Physician acceptance not yet determined.
Coronary Prognostic Index (Norris)	Yes. Five age groups are used. Index increases with age.	No reported use has been identified.	Risk factors were identified for comparison of treatments. System not widely applied.
Injury Severity Score (Champion)	No	Algorithm required for producing probability of mortality is not presented.	Useful for inter- EMS comparisons.
Glasgow Coma Score (Jennett)	No	Widely used for head trauma and global brain ischemia. Also used for hourly monitoring by nurses.	If the patient is on high doses of neuro-muscular blocking drugs or barbiturates, variables can be difficult to measure accurately.
Global Index (Champion)	No	No published data	Not widely accepted.
Multi Factorial Index of Cardiac Risk (Goldman)	Yes. Age >70 greater cardiac complications after surgery.	If index is high, risk of cardiac complication after surgery may be unacceptable for elective cases.	Needs further testing. Pre-op Swan-Ganz catheter may yield more specific information in borderline cases.
Revised Estimated Survival Probability (Levy)	Yes. 3 age groups are used.	No	ISS has been shown to be superior to RESP for a number of validity measures (Goldberg et al, 1984).
Streamlining ICU Care (Thibault and Mulley)	Yes. Age is a risk factor.	Theoretically yes. No reported results to date.	Educational approach in early stages of development.
Trauma Score (Champion)	No	Only useful for field triage. Has not been accepted for clinical predictions	Can be used for comparing trauma care in different EMS systems. Widely validated for trauma patients. Not suggested for use with general ICU patients.

Table 29. Summary of Other Approaches to Patient Classification

	Special reference to the elderly?	Use for clinical decisionmaking for the critically ill?	Other general comments
Systems for Specific Critical Illnesses (Continued)			
Trauma Severity Index (Gustafson) (Based on Wisconsin Trauma Index)	Yes. Age is one of the variables	No	Useful for inter- EMS comparisons.
Classifications Based on Invasive Measurements			
Cumulated Prognostic Index for Drug Overdose (Afifi)	No	Requires invasive monitoring so not useful for many patients.	Not currently used.
Global Predictive Index in Circulatory Failure (Bland and Shoemaker)	No	For individual patient with Swan-Ganz catheter placed early in ICU course with complete hemodynamic profile.	Not applicable for widespread use. Complicated numerical and graphic procedures dependent on availability of computer hardware and software.
Myocardial Infarction and Shock (Afifi)	No	Requires invasive monitoring so not useful for many patients.	Not currently used.
General Systems			
Diagnostic Related Groups (Fetter)	Yes. Weight is added for patients 70 years of age and older.	No, however high DRG outliers may be referred to tertiary hospitals.	Has become a major system as a mechanism for prospective reimbursement. DRG category does not reflect severity of illness of ICU patients.
Generalized Patient Management Paths (Young)	Yes. Age is a factor for some conditions.	Not useful since based in part on discharge data. Designed for financial management.	Sensitive to therapeutic variation in diagnostic group. Has potential for use in cost analysis and reimbursement.
Generic Algorithms (Bertram)	No	Same as above.	Application to ICU care is not clear.
MEDICUS (Hegyvary)	No	No. However, may help to disitinguish between 1:1 and 1:2 nurse:patient assignment in the ICU.	One of many approaches to measuring the quality of nursing service. Does not directly measure severity of illness.
MEDISGRIPS (Brewster)	No	No	Variables are subjective. Presumes that severity during the first day predicts resource use. No validation of this system presented.
Severity of Illness Index (Horn)	No	No	Requires substantial clinical judgement to evaluate medical record. Does not predict resource use since data are collected at discharge.
Staging of Disease (Gonnella)	No	Only for comparison studies within specific diseases	Inappropriate for comparing stages between different diagnoses

Figure 1. Cumulative Distributions of Probability of Hospital Mortality for MPMadm(OSF), APS and SAPS

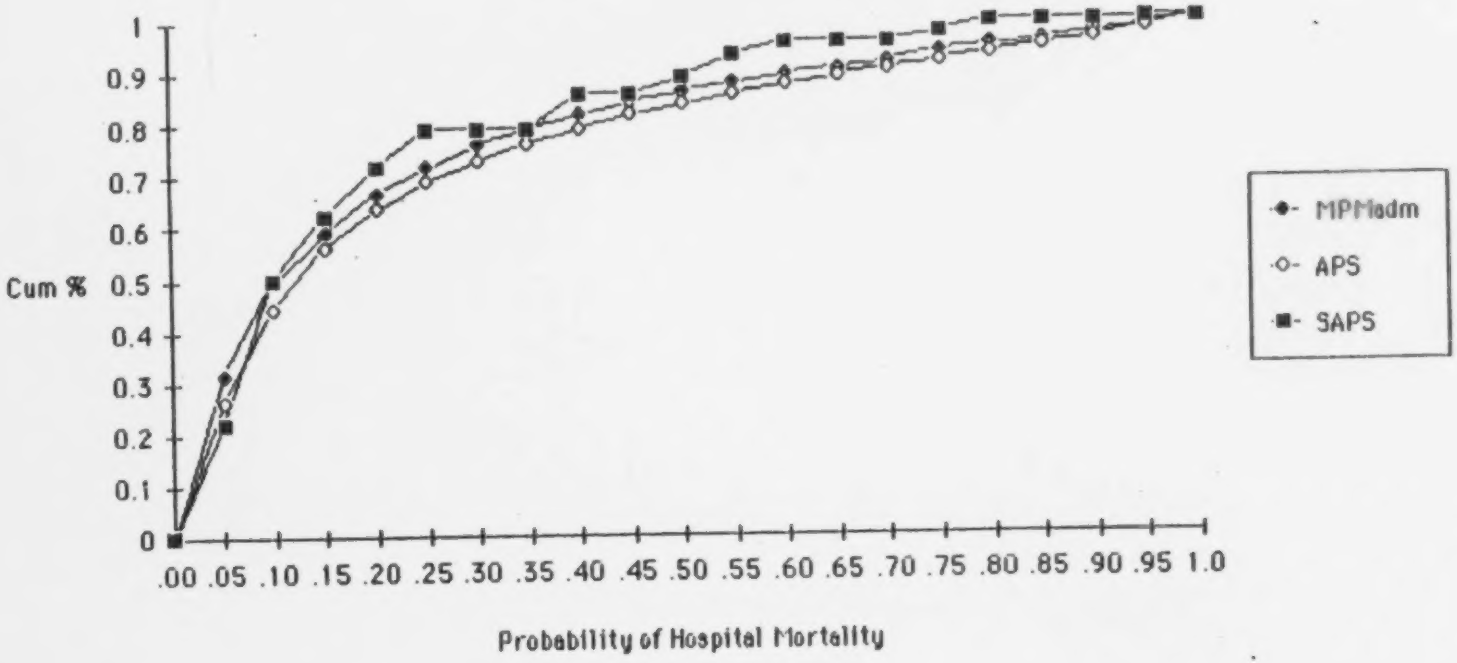


Figure 2. Survival Status by Probability of Hospital Mortality

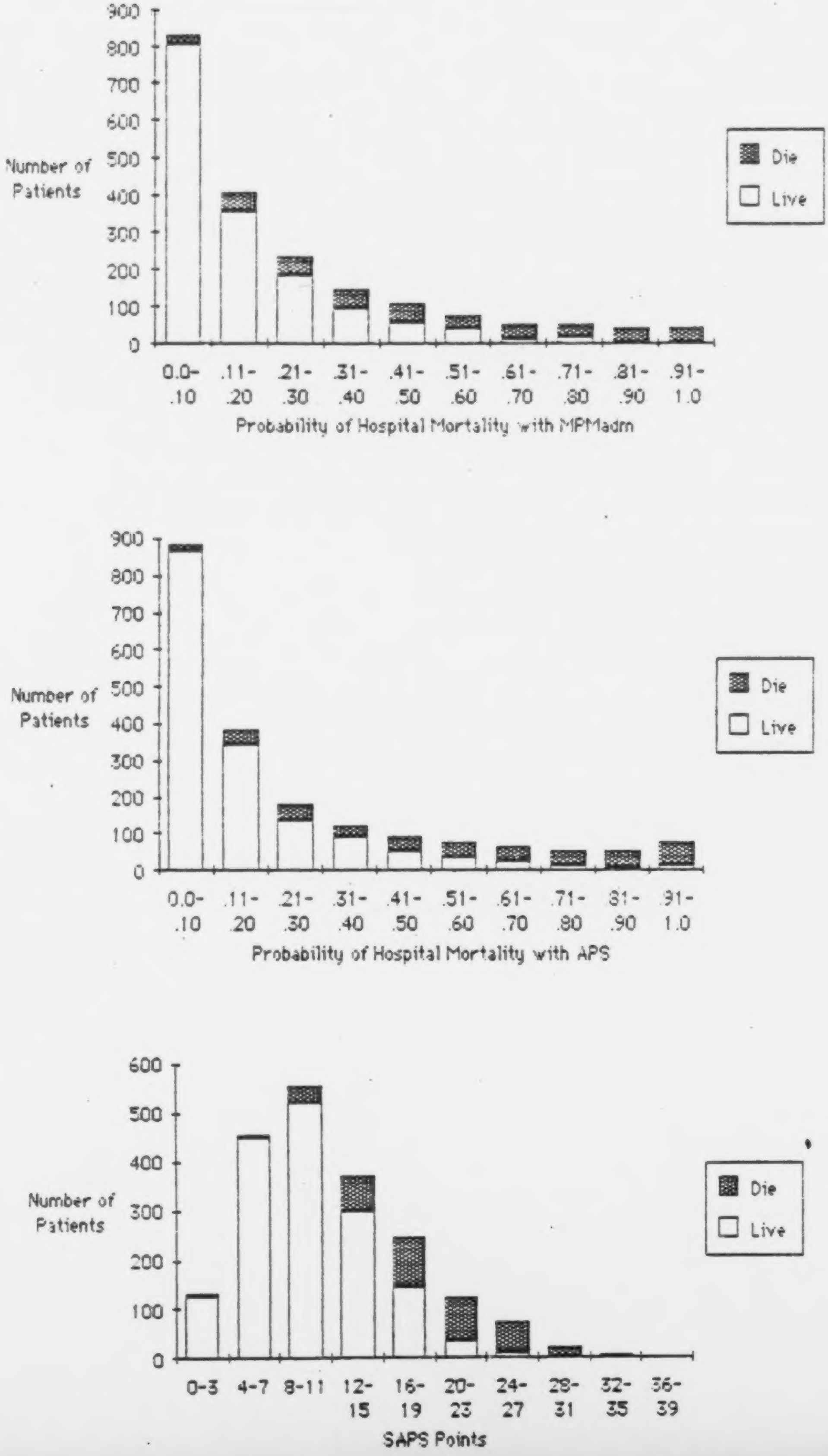
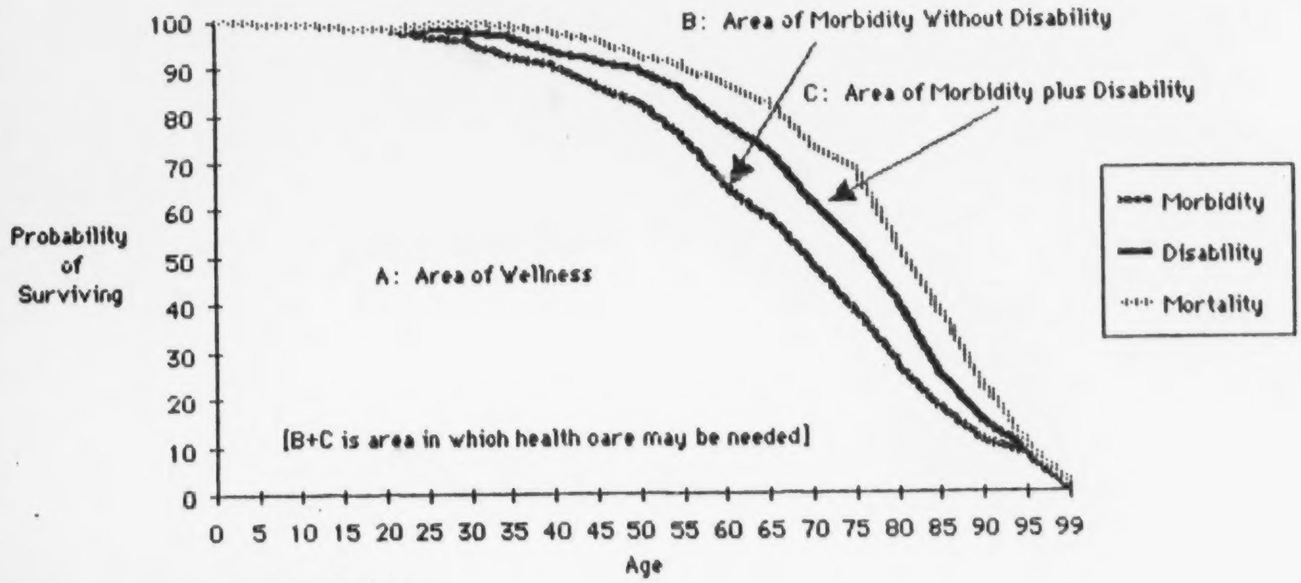


Figure 3. Hypothetical Mortality, Disability and Morbidity Survival Curves



Adopted from Manton and Soldo (1985)

APPENDIX

UNIVERSITY OF MASSACHUSETTS/BAYSTATE MEDICAL CENTER
ICU MORTALITY PREDICTION MODEL (MPM)

ADMISSION

Patients to be Excluded from Study:

- Burn patients
- Coronary Care Unit patients
- Cardiac surgery patients
- Patients under 14 years of age

[Name of Person Completing Form: ______________________________]

Patient Name: ____________________ Study ID Number ☐ , ☐ ☐

Age: ☐ ☐

ICU Admission: Date ______________ Time __________ (circle am or pm)

Type of ICU Admission: ☐ Elective Surgery (Any surgery that is scheduled at least 24 hours in advance.) [Includes pre-operative Swan-Ganz insertion if elective surgery patient.]

☐ Emergency (All medical patients, all non-operative surgical patients, and all surgical patients whose names are added to the operating room schedule within 24 hours of surgery.)

Cancer as an Active Medical Problem (within 6 months of ICU admission) ☐ No ☐ Yes

Infection Probable at ICU Admission: ☐ No ☐ Yes

(Check "yes" if cultures, Gram stains, or x-rays were done to confirm a suspected infection; if there is evidence of gross purulence; or if antibiotics were being administered on admission to ICU.
Check "yes" if extensive soft tissue injuries or open wounds in multiple trauma patients.
Prophylactic antibiotic therapy does not constitute infection.
Routine intra-operative cultures do not necessarily indicate the presence of infection.
Determine possibility of infection from patient's history, and doctors' and nurses' notes.)

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Organ Systems in Failure or Insufficiency at ICU Admission:

(Check each system which is and of itself is in failure or insufficiency severe enough to necessitate ICU admission. Each patient must have at least one organ system checked.)

☐ Cardiac

Some examples:
- Preoperative Swan-Ganz insertion for patients with previous MI or CHF
- Uncontrolled hypertension
- Cardiac induced CHF
- Cardiac monitoring - rhythm disturbance, active ischemic heart disease
- Cardiac contusion, tamponade
- CPR with chest compressions or defibrillation [Also check "Respiratory" if ventilator required.]

☐ Vascular

Some examples:
- Thrombectomy, embolectomy
- Swan-Ganz insertion for patients with shock, tachycardia, or low blood pressure
- Sepsis
- Carotid endarterectomy
- Multiple trauma if hemodynamically unstable
- Hypovolemia
- Angioplasty (excluding coronary angioplasty)

☐ Respiratory

Some examples:
- ARDS
- Pulmonary edema necessitating ventilation
- COPD requiring frequent treatment
- Pneumothorax (large or under tension)
- Potential airway obstruction
- Unable to wean from ventilator in recovery room
- Flail chest or lung contusion

☐ Gastrointestinal (including esophagus, liver, pancreas, gallbladder)

Some examples:
- Porta-Caval or Spleno-Renal Shunt
- GI bleed
- Perforation/obstruction
- Extensive surgery

Does not include standard GI surgery if patient is in ICU for insufficiency of another organ system.

☐ Neurologic

Some examples:
- Cerebral aneurysm
- Cranial hemorrhage
- Overdose with a change in level of consciousness
- Head trauma
- Seizures
- Metabolic encephalopathy
- Alcohol withdrawal

☐ Renal

Some examples:
- Acute renal failure
- Chronic renal failure (unstable)
- Extensive genito-urinary surgery

☐ Metabolic

Some examples:
- Hypothermia (exposure)
- Diabetic ketoacidosis
- Severe electrolyte imbalance
- Uncompensated primary metabolic acidosis or alkalosis

☐ Hematologic/Immunologic

Some examples:
- Sickle cell anemia crisis
- Severe coagulopathy
- AIDS
- Leukemia
- Long-term corticosteroids

Check the Process that Precipitated Organ Dysfunction (check only one)

☐ Trauma

☐ Poisoning/Medication

☐ Cancer

☐ Atherosclerosis

☐ Respiratory disease

☐ Infection/Sepsis

☐ Other (specify:________________________________)

Systolic Blood Pressure at ICU Admission: ☐ ☐ ☐

(Enter first SBP recorded within the first hour of ICU stay. If a blood pressure is not available in first hour, use the SBP within 1 hour preceding ICU admission.)

CPR within 24 Hours Prior to ICU Admission: ☐ No ☐ Yes

(CPR must include chest compressions, defibrillation, or cardiac massage)

Level of Consciousness at ICU Admission (check only one):
[For patients on a paralyzing muscle relaxant or awakening from anesthesia, use your best judgment of the level of consciousness.]

☐ Coma (Generally corresponds to a Glasgow Coma Score of 3)
(No response to any stimulation, no twitching, no movement in extremities, no response to pain or command.)

☐ Deep Stupor (Generally corresponds to a Glasgow Coma Score of 4 or 5)
(Only those patients who exhibit decorticate or decerebrate posturing; posturing is spontaneous or in response to stimulation or deep pain, not in response to commands.)

☐ Neither Coma nor Deep Stupor
(All patients who do not fit the definitions of coma or deep stupor.
For example:
Patients who are awake, alert, and responsive
Patients who are stuperous or very lethargic in responding to commands
Patients who are seizing, postictal, or twitching
Patients in persistent vegetative state - i.e., those capable of breathing spontaneously and may open their eyes, but do not have cognition)

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